BANGALORE WATER SUPPLY
AND
SEWERAGE BOARD

Office of the Executive Engineer,
BANGALORE WATER SUPPLY AND SEWERAGE BOARD,
North West - 1 Division
West of Chord road, Behind Modi Hospital, 2nd stage,
Bangalore-560086

Tender document for the work of

Providing and laying 300mm dia RCC NP3 sewer line from Mahalakshmi Entrance to Panchamukhi Temple Mahalakshmi Layout coming under Mahalakshmi Layout service station area of AEENW-1 Sub Division.

(Through KPP portal only)

www.kppp.karnataka.gov.in

TENDER REFERENCE :	:	**IFT No.:BWSSB/EE(NW)-1/PB/1788/2024-25 DATED: 29.07.2024**
PERIOD OF SALE OF TENDER DOCUMENT :	:	From:30-07-2024 to 07-08-2024
LAST DATE FOR SALE OF TENDER DOCUMENT :	:	07-08-2024upto 17.30 hrs
LAST DATE AND TIME FOR RECEIPT OF TENDERS :	:	07-08-2024upto 17.30 hrs
TIME AND DATE OF OPENING OF TENDERS:	:	09-08-2024 upto 15.00 hrs
PLACE OF OPENING OF TENDERS	:	*Office of the Executive Engineer (North West)-1 Division Bangalore Water Supply & Sewerage Board West of Chord road, 2nd Stage, Bangalore -560086.*
ADDRESS FOR COMMUNICATION	:	*Office of the Executive Engineer (North West) -1Division Bangalore Water Supply & Sewerage Board West of Chord road, 2nd Stage, Bangalore -560086.*

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SECTION-1

BANGALORE WATER SUPPLY AND SEWERAGE BOARD
Office of the Executive Engineer
NorthWest-1Division
West of Chord road, 2nd stage,
Bangalore– 560086

INVITATION FOR TENDER
(ITEMWAR TENDER)

http:/www.eproc.karnataka.gov.in

IFT No.:BWSSB/EE(NW)-1/PB/1788 /2024-25 DATED: 29.07.2024

For and on behalf of the Bangalore Water Supply and Sewerage Board, ITEM WAR TENDER is invited through e-procurement process with tender procedure in line with Rule 28 of the KTPP Act by the Executive Engineer, North West -1 Division, West of Chord road, 2nd stage, Bangalore-86 for the following work from registered Agencies of appropriate class of BWSSB/KUWSDB/KPWD, etc. who are having adequate financial resources, past experience in similar nature of work possessing valid GSTIN registration. The Board keeps the right of acceptance or rejection of any tender without assigning any reasons.

The Tenderers are required to pay the Earnest Money Deposit only through e-procurement portal only using any of the four modes.

1. (1) Credit Card (Online Payment) (2) Direct Debit using Internet Banking (Online Payment) (3) Remittance at the Bank Counter – Challan (offline Payment) 4) NEFT (National Electronic Fund Transfer) (Offline payment). The details regarding their capability to undertake the tender (as detailed in ITT Clause 4) and the price tender shall be uploaded in the website. The Tenderers are advised to note the minimum qualification criteria specified in Clause 3 of the Instructions to Tenderers to qualify for award of the contract.
2. Tender documents may be downloaded from www.kppp.karnataka.gov.in website only. Interested tenderers may obtain further information at the same address.

3. Additional information related to e-procurement process can be obtained through the above mentioned website or contact e-procurement helpdesk No.**+91 80 46010000, +91 80 68948777**
4. Bidders can access tender documents from www.kppp.karnataka.gov.inwebsite and upload the required details; those are mentioned in different sections in the bid document in to electronic tender on the website. Scanned documents those are required to be furnished as per Section 2, 3 & 4 of the bid document (INSTRUCTIONS TO TENDERERS (ITT))shall be submitted through e-procurement.
5. The Tender processing fee once paid will not be refunded.
6. Date of Publication :**30.07.2024** and the last date and time for Receipt of tenders will **be on 07.08.2024 upto17:30**Hrs and the date of opening of tender will **be on 09.08.2024** after **15:00** Hrs.

TABLE

Sl. No	Name of work	Amount put to tender	Earnest Money Deposit @ 2.0%	Tender Processing fee	Period of Completion of work	Remarks
1	Providing and laying 300mm dia RCC NP3 sewer line from Mahalakshmi Entrance to Panchamukhi Temple Mahalakshmi Layout coming under Mahalakshmi Layout service station area of AEENW-1 Sub Division	Rs.2158680/- (Exclusive GST) GST of Rs. 3,88,562/- Tota- 25,47,242/-	Rs.51,000 /-	As per e-procurement portal	2 months	KW-2 Applicable

<u>The Eligibility criterion for the above works allotted for General category is as follows:</u>

- Contractors should have Civil Contractorregistration BWSSB, KPWD/KUWSDB etc.
- The Tenderer should have in the last 5 years period achieved in at least two financial years an average annual financial turnover of rupees not less than the estimated cost i.e., **Rs.25.47 lakhs. (Profit & Loss Account, Balance sheet certified/Audited by Charted Accountant).**
- The Tenderer should have satisfactorily completed one similar work to an extent of 50% of the work i.e., **12.74 lakhs.**
- Assessed available tender capacity = (A*N*2.5 - B) should be greater than amount put to tender.

- Form of tender is mandatory to upload in KPPP portal.(disclosure of financial bid will be treated as non-responsive)
- Third party will be nominated by BWSSB.
- Refer Annexure (A) enclosed along for jurisdiction of the courts and safety measures to be taken while executing the works as per letter No.BWSSB/EIC/CE(P)/0027/2016-17 Dt:10.04.2017 & further hereby informed to include the same in the contract agreement.

7. The tender is based on Two Cover System

8. The Successful bidder would be required to give performance bank guarantee of 5% of the contract amount plus additional security for unbalanced bid amount from a Nationalized / Scheduled Indian Bank, with jurisdiction at Bangalore as specified, towards guarantee for completion of work within the stipulated period.

9. Applications / requisitions from joint venture firms are not acceptable.

10. Bangalore Water Supply and Sewerage Board (BWSSB) reserve the right to cancel or annul the entire or part of this process of invitation at any time without assigning any reason.

11. For any additional information regarding the above tender, the firms who are interested to quote, may contact office of the undersigned at the office address given below on all working days during office hours (10:30hours to 17:00 hours).

12. List of documents to support qualification of bidder is to be uploaded to the e-procurement website www.kppp.karnataka.gov.in.

13. Bidders shall submit offers that comply with the requirements of the bid document, including the basic technical design as indicated in the drawing and specifications. Alternatives will not be considered. The attention of the bidders is drawn to clause 23 regarding the rejection of the bids, which are not substantially responsive to the requirement of the bid document.

14. Other details can be seen in the tender documents.

15. The works to be executed in accordance with the contract documents and to carry out all the works as per the guidelines. Any lapses in following the safety guidelines, the contractor/agency/firm will be held solely responsible.

16. Cutting Road Surfaces for Pipe line trenches should be executed using road cutting machines only.

Further details may be had from this office during the office hours on all working days.
Corrigendum / Addendum /Modification/corrections, if any, will be published in theWebsite only.

Executive Engineer (NW)-1
Bangalore Water Supply & Sewerage Board
West of Chord road, Behind Modi Hospital
2nd Stage, Bangalore -560086.

SECTION 2:
INSTRUCTIONS TO TENDERERS (ITT)
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General

1. Scope of Tender

1.1 The Executive Engineer, North West-1 Division, BWSSB(Referred to as Employer in these documents) invites tenders from eligible tenderers for the work. (as defined in these documents and referred to as "the works") detailed in the Table given in the Invitation for Tenders (IFT).

2. Eligible Tenderers

2.1 Tenderers shall not be under a declaration of ineligibility for corrupt and fraudulent practices issued by the Government of Karnataka

2.2 **Tenders from Joint ventures are not acceptable.**

3. Qualification of the Tenderers:

3.1 All tenderers shall provide the requested information accurately and in sufficient details in section 3 Form of tender.(disclosure of financial bid will be treated as non-responsive) and qualification information

3.2 To qualify for award, each tenderers in its name should have in the last 5 years i.e2019-20 to
2023-24

3.2.2 Achieved in at least 1 financial years a minimum financial turnover (it all classes of Civil Engineering construction works only) of **Rs.25.47** Lakhs (usually not less than the estimated annual payment under this contracts)Balance sheet statement certified/audited by a Chartered Accountant along with UDIN No. to be submitted, which is mandatory.

- the**UDIN** No. (Unique Document Identification Number) is mandatoryOn all financial certificates

(b) Satisfactorily completed one similarwork of value not less than Rs.12.72 Lakhs(providing and laying of 300mm dia RCC NP3 sewer line)(usually not less than 50% of amount put to tender)
(c) Deleted
(d) Deleted

3.3 Each tenderer should further demonstrate :

(a) Availability by owning the following key at critical equipment for his work :
(b) Liquid assets and / or availability of credit facilities of no less than Rs. .....credit lines / letter of credit / certificate from bank for meeting fund requirements etc., (usually the equivalent of the estimated cash flow for 4 months in the peak constructions period

3.4 To qualify for a package of contracts made up of this and other contracts for which tenders are invited in this IFT, the tenderer must

demonstrate having experience and resources to meet the aggregate of the qualifying criteria for the individual contractors

3.5 Sub-contractors experience and resources shall not be taken into account in determining the tenderer's compliance with the qualifying criteria except to the extend stated 3.2(d)and (e) above.

3.6 Tenderers who meet the above specified minimum qualifying criteria, will only be qualified, if their available tender capacity is more than the total tender value. The available tender capacity will be calculated as under "

Assessed available tender capacity = (A*N*2.5 - B)
where
A = Maximum value of civil engineering works executed in any one year during the last five years (updated to 2023-24[5] price level) taking into account the completed as well as works in progress.
N = Number of years prescribed for completion of the works for which Tenders are invited.
B = Value, at 2023-24[6]price level, of existing commitments and on-going works to be completed during the next period of completion of the works for which tenders are invited[7]years.

Note: The statements showing the value of existing commitments and on-going works as well as the stipulated period of completion remaining for each of the works listed should be countersigned by the Employer in charge, not below the rank of an Executive Engineer or equivalent.

3.7 Even though the tenderers meet the above criteria, they are subject to be disqualified if they have:

- made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements; and/or

- record of poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion, litigation history, or financial failures etc.; and/or

- participated in the previous Tender for the same work and had quoted unreasonably high tender prices and could not furnish rational justification.

B. Tender documents

4. Content of Tender documents

4.1 The set of tender documents shall have all the Sections given in Page 3:

4.2 Both the sets should be completed and returned with the tender.

5. Amendment of Tender documents

5.1 Before the deadline for submission of tenders, the Employer may modify the tender documents by issuing addenda.

5.2 Any addendum thus issued shall be part of the tender documents and shall be communicated in writing or by cable to all the purchasers of the tender documents.

5.3 To give prospective tenderers reasonable time in which to take an addendum into account in preparing their tenders, the Employer shall extend as necessary the deadline for submission of tenders, in accordance with Sub-Clause 12.2 below.

C. Preparation of Tenders

6. Documents comprising the Tender

6.1 The tender submitted by the Tenderer shallcomprise the following :

(a) The tender (in format indicated in Section-3)
(b) Earnest Money Deposit;
(c) Qualification Information as per format given in Section 3 :
(d) Priced Bill of Quantities (Section 9).

and any other materials required to be completed and submitted by tenderers in accordance with these instructions. **The documents listed under Sections 3, 5, and 8 shall be filled in without exception.**

7. Tender prices

7.1 The contract shall be for the whole works as described in Sub-Clause 1.1, based on the priced Bill of Quantities submitted by the Tenderer.

7.2 The Tenderer shall fill in rates and prices and line item total (both in figures and words) for all items of the Works described in the Bill of Quantities along with total tender price (both in figures and words). **Items for which no rate or price is entered by the Tenderer will not be paid for by the Employer when executed and shall be deemed covered by the other rates and prices in the Bill of Quantities.**Corrections, if any, shall be made by crossing out, initialing, dating and rewriting.

7.3 All duties, taxes, and other levies payable by the contractor under the contract, or for any other cause, shall be included in the rates, prices and total Tender Price submitted by the Tenderer excluding GST, GST will be reimbursed at prevailing rates as applicable.

7.4 The rates and prices quoted by the Tenderer shall be fixed for the duration of the Contract and shall not be subject to adjustment on any account.

8. Tender validity

8.1 Tenders shall remain valid for a period not less than ninety days after the deadline date for tender submission specified in Clause 12. A tender valid for a shorter period shall be rejected by the Employer as non-responsive.

8.2 In exceptional circumstances, prior to expiry of the original time limit, the Employer may request that the tenderers may extend the period of validity for a specified additional period. The request and the tenderers' responses shall be made in writing or by cable. A tenderer may refuse the request without forfeiting his earnest money deposit. A tenderer agreeing to the request will not be required or permitted to modify his tender, but will be required to extend the validity of his earnest money deposit for a period of the extension, and in compliance with Clause 9 in all respects.

9. Earnest money deposit

1. The Bidder should pay the E.M.D. and tender processing fees by the following modes through e-payment
    1) Through Credit Card
    2) Debit through Internet Banking
    3) Over the Counter (OTC) (Axis Bank)
    4) NEFT – National Electronic Fund Transfer

9.2 Deleted

9.3 Any tender not accompanied by an acceptable earnest money deposit and not secured as indicated in Sub-Clauses 9.1 and 9.2 above shall be rejected by the Employer as non-responsive.

9.4 The earnest money deposit of unsuccessful tenderers will be returned within 30 days of the end of the tender validity period specified in Sub-Clause 8.1.

9.5 The earnest money deposit of the successful Tenderer will be discharged when the Tenderer has signed the Agreement and furnished the required Performance Security.

9.6 The earnest money deposit may be forfeited:

(a) if the Tenderer withdraws the Tender after tender opening during the period of tender
validity;
(b) if the Tenderer does not accept the correction of the Tender Price, pursuant to Clause 19; or

(c) in the case of a successful Tenderer, if the Tenderer fails within the specified time limit to

(i) sign the Agreement; or

(ii) furnish the required Security deposit

10. Format and signing of Tender

10.1 The Tenderer shall prepare one original and a copy of the documents comprising the Tender as described in Clause 6 of these Instructions to Tenderers, bound with the volume containing the Form of Tender, and clearly marked "**ORIGINAL**" and "**COPY"** as appropriate. In the event of discrepancy between them, the original shall prevail.

10.2 The original and a copy of the Tender shall be typed or written in indelible ink and shall be signed by a person or persons duly authorized to sign on behalf of the Tenderer. All pages of the tender where entries or amendments have been made shall be initialed by the person signing the tender

10.3 The Tender shall contain no alterations or additions, except those to comply with instructions issued by the Employer, or as necessary to correct errors made by the Tenderer, in which case such corrections shall be initialed by the person signing the Tender.

D. Submission of Tenders

11. Sealing and marking of tenders

11.1 The Tenderer should submit the tender through E-Tender-portal

11.2Deleted
11.3Deleted
11.4Deleted

12. Deadline for submission of the Tenders

12.1 Tenders must be uploaded no later than 00.00.2024before 17:30 hours.

12.2 The Employer may extend the deadline for submission of tenders by issuing an amendment in accordance with Clause 5, in which case all rights and obligations of the Employer and the Tenderers previously subject to the original deadline will then be subject to the new deadline.

13. Late Tenders

13.1 Deleted.

14. Modification and Withdrawal of Tenders

14.1 Tenderers may modifyor withdraw their Tenders by giving notice in web before the deadline prescribed in Clause 12.

14.2 Each Tenderer's modification or withdrawal notice shall be prepared, sealed, marked, and uploaded in accordance with Clause 10 & 11, additionally marked "**MODIFICATION**" or "**WITHDRAWAL**", as appropriate.

14.3 No Tender may be modified after the deadline for submission of Tenders.

14.4 Withdrawal or modification of a Tender between the deadline for submission of Tenders and the expiration of the original period of Tender validity specified in Clause 8.1 above or as extended pursuant to Clause 8.2 may result in the forfeiture of the earnest money deposit pursuant to Clause 9.

1 4.5 Tenderers may only offer discounts to, or otherwise modify the prices of their Tenders by submitting Tender modifications in accordance with this clause, or included in the original Tender submission.

E. Tender opening and evaluation

15. Opening of first cover of or tenderers and evaluation to deter my qualified tenderers

15.1 The Employer will all the Tenders received (except those received late or withdrawn), including **modifications** made pursuant to Clause 14, in the presence of the Tenderers or their representatives who choose to attend at 16:00 hours on the date and the place specified in Clause 12. In the event of the specified date of Tender opening being declared a holiday for the Employer, the Tenders will be opened at the appointed time and location on the next working day.

15.2 Envelopes marked "**WITHDRAWAL**" shall be opened and read out first. The first cover of Tenders for which an acceptable notice of withdrawal has been submitted pursuant to Clause 14 shall not be opened.

15.3 The Tenderers' names, the presence of absence of earnest money deposit (amount, format and validity) the submission of qualification information and such other information as the employer may consider appropriate will be announced by the employer at the opening. Late and withdrawn Tenders will be returned un-opened to Tenderers.

15.4 The Employer shall prepare minutes of the Tender opening, including the information disclosed to those present in accordance with Sub-Clause 15.3.

15.5 The employer will evaluate and determine whether each tender (a.) meet the eligibility create area defined in ITT class to ; (b) is accompanied by the required earnest money deposit as per stipulations in ITT class and (c) meets the minimum qualification criteria stipulated in ITT class 3. The employer will draw out a list of qualified tenderers.

16. Process to be confidential

16.1 Information relating to the examination, clarification, evaluation, and comparison of Tenders and recommendations for the award of a contract shall not be disclosed to Tenderers or any other persons not officially concerned with such process until the award to the successful Tenderer has been announced. Any effort by a Tenderer to influence the Employer's processing of Tenders or award decisions may result in the rejection of his Tender.

17. Clarification of Tenders

17.1 To assist in the examination, evaluation, and comparison of Tenders, the Employer may, at his discretion, ask any Tenderer for clarification of his Tender, including breakdowns of unit rates. The request for clarification and the response shall be in writing or by cable, but no change in the price or substance of the Tender shall be sought, offered, or permitted except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Tenders in accordance with Clause 19.

17.2 Subject to sub-clause 18.1, no Tenderer shall contact the Employer on any matter relating to its Tender from the time of the Tender opening to the time the contract is awarded. If the Tenderer wishes to bring additional information to the notice of the Employer, it should do so in writing.

17.3 Any effort by the Tenderer to influence the Employer in the Employer’s Tender evaluation, Tender comparison or contract award decisions may result in the rejection of the Tenderers’ Tender.

18. Examination of Tenders and determination of responsiveness

18.1 Prior to the detailed evaluation of Tenders, the Employer will determine whether each Tender (a)has been properly signed; (b) is substantially responsive to the requirements of the Tender documents.

18.2 A substantially responsive Tender is one which conforms to all the terms, conditions, and specifications of the Tender documents, without material deviation or reservation. A material deviation or reservation is

one (a) which affects in any substantial way the scope, quality, or performance of the Works; (b) which limits in any substantial way, inconsistent with the Tender documents, the Employer's rights or the Tenderer's obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other Tenderers presenting substantially responsive Tenders.

18.3 If a Tender is not substantially responsive, it will be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal of the nonconforming deviation or reservation.

19. Correction of errors

19.1 Tenders determined to be substantially responsive will be checked by the Employer for any arithmetic errors. Errors will be corrected by the Employer as follows:

(a) where there is a discrepancy between the rates in figures and in words, the lower of the two will govern; and

(b) where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will govern.

19.2 The amount stated in the Tender will be adjusted by the Employer in accordance with the above procedure for the correction of errors and, with the concurrence of the Tenderer, shall be considered as binding upon the Tenderer. If the Tenderer does not accept the corrected amount the Tender will be rejected, and the earnest money deposit may be forfeited in accordance with Sub-Clause 9.6 (b).

20. Evaluation and comparison of Tenders

20.1 The Employer will evaluate and compare only the Tenders determined to be substantially
responsive in accordance with Clause 18.

20.2 In evaluating the Tenders, the Employer will determine for each Tender the evaluated Tender Price by adjusting the Tender Price as follows:

(a) making any correction for errors pursuant to Clause 19; and

(b) making appropriate adjustments to reflect discounts or other price modifications offered in accordance with Sub Clause 14.5.

20.3 The Employer reserves the right to accept or reject any variation, deviation, or alternative offer. Variations, deviations, and alternative offers and other factors which are in excess of the requirements of the Tender documents or otherwise result in unsolicited benefits for the Employer shall not be taken into account in Tender evaluation.

20.4 If the tender of the successful tenderer is seriously unbalanced in relation to the employer's estimate of the cost of the work to be performed under the contract, the employer may require the tenderer to produce detailed price analyses for any or all items of the Bill of Quantities, to demonstrate the internal constituency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, the employer may require that the amount of the performance security set forth in clause 29 be increased at the expense of the successful tenderer to level sufficient to protect the employer against financial loss in the even of default of the successful under the contract

F. Award of Contract

21. Award criteria

21.1 Subject to Clause 23, the Employer will award the Contract to the Tenderer whose Tender has been determined to be substantially responsive to the Tender documents and who has offered the lowest evaluated Tender Price, provided that such Tenderer has been determined to be (a) eligible in accordance with the provisions of Clause 2, and (b) qualified in accordance with the provisions of Clause 3.

22. Employer's right to accept any Tender and to reject any or all Tenders

22.1 Notwithstanding Clause 21, the Employer reserves the right to accept or reject any Tender, and to cancel the Tender process and reject all Tenders, at any time prior to the award of Contract, without thereby incurring any liability to the affected Tenderer or Tenderers or any obligation to inform the affected Tenderer or Tenderers of the grounds for the Employer's action.

23. Notification of award and signing of Agreement

23.1 The Tenderer whose Tender has been accepted will be notified of the award by the Employer prior to expiration of the Tender validity period by cable, telex or facsimile confirmed by registered letter. This letter (hereinafter and in the Conditions of Contract called the "Letter of Acceptance") will state the sum that the Employer will pay the Contractor in consideration of the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price").

23.2 The notification of award will constitute the formation of the Contract, subject only to the furnishing of security in accordance with the provisions of Clause 24.

23.3 The Agreement will incorporate all agreements between the Employer and the successful Tenderer. It will be kept ready for signature of the successful Tenderer in the office of Employer within 30 days following the notification of award along with the Letter of Acceptance. Within

20 days of receipt, the successful Tenderer will sign the Agreement and deliver it to the Employer.

23.4 Upon the furnishing by the successful Tenderer of the Security deposit, the Employer will promptly notify the other Tenderers that their Tenders have been unsuccessful.

24. Security deposit

24.1 Within 20 days of receipt of the Letter of Acceptance, the successful Tenderer shall deliver to the Employer a Security deposit in any of the forms given below for an amount equivalent to 5% of the Contract price plus additional security for unbalanced tenders in accordance with clause 20.4 of ITT and clause 44 of the conditions of contract

- Cash or Banker's cheque/Demand draft, /Pay Order in favor of**Chairman, BWSSB**, Payable at **Office of the Executive Engineer, Water Supply and sanitary Division (Northwest)-1, 2nd Stage, W.C.Road, behind Modi Hospital, Bangalore-560086.**

- A Bank guarantee in the form given in section 10

- Specified Small Savings Instruments pledged to Chairman BWSSB

24.2 If the Security deposit is provided by successful tenderer in the form of a Bank guarantee, it shell be issued either by a nationalised / scheduled Bank.

24.3 The Security deposit if furnished in cash or demand draft can, if requested, be converted to interest bearing security at the cost of the contractor.

24.4 Failure of the successful Tenderer to comply with the requirements of Sub-Clause 24.1 shall constitute sufficient grounds for cancellation of the award and forfeiture of the earnest money deposit.

25. Corrupt or Fraudulent practices

25.1 The GOK requires that the Tenderers, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, GOK:

(a) will reject a proposal for award if it determines that the Tenderer recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;
(b) will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a GOK contract if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing, a GOK contract.

25.2 Furthermore, Tenderers shall be aware of the provision stated in sub-clause 43.2 of the Conditions of Contract.

SECTION 3: FORM OF TENDER AND QUALIFICATION INFORMATION

Form of Tender

Description of the Works: Providing and laying 300mm dia RCC NP3 sewer line from Mahalakshmi Entrance to Panchamukhi Temple Mahalakshmi Layout coming under Mahalakshmi Layout service station area of AEENW-1 Sub Division.

To :

The Executive Engineer
North West Division
BWSSBNorth West Division-1,
West of Chord road, 2nd stage,
Bangalore-86

Sir,

We offer to execute the Works described above in accordance with the Conditions of Contract accompanying this Tender for the Contract Price of

Rs.__**As per BOQ**_____ [in figures] (_____) [in letters].[12]

This Tender and your written acceptance of it shall constitute a binding contract between us. We understand that you are not bound to accept the lowest or any Tender you receive.

We undertake that, in competing for (and, if the award is made to us, in executing) the above contract, we will strictly observe the laws against fraud and corruption in force in India namely "Prevention of Corruption Act 1988".

We hereby confirm that this Tender complies with the Tender validity and Earnest money deposit required by the Tender documents.

We attach herewith our current income-tax clearance certificate.

Yours faithfully,

Authorized Signature:

Name & Title of Signatory: .....

Name of Tenderer _____

Address: ----------

[Note :Tenderer shall down load this page, fill the gaps with signature(except price) scan the sheet & upload to the website. Failing which the tender will be treated as non-responsive – (Contract price both in figures & letters should be mentioned clearing, "As per BOQ", separate sheet enclosed, etc will not be accepted)]

QUALIFICATION INFORMATION

The information to be filled in by the Tenderer hereunder will be used for purposes of computing Tender capacity as provided for in Clause 3 of the Instructions to Tenderers. This information will not be incorporated in the Contract.

1.1 Constitution or legal status of Tenderer [Attach copy]
place of Registration
Principal place of Business[Attach copy]

1.2 Total value of civil engineering works executed and payments received in the last five years
(in Rs. Lakhs). Attach certificate from charted Accountant

2019 -20_____

2020 -21_____

2021-22_____

2022-23 _____

2023-24.----------

1.3 Work performed has prime contractor (in the same name) on works of similar nature over
during the 5 years specified in 1.2 above.

Project Name	Name of Employer	Description of work	Contract Number	Value of contract Rs.Lakhs	Date of issue of work order	Specified period of completion	Actual date of complelti on	Remarks explaining reasons for delay in completion of work
1	2	3	4	5	6	7	8	9

Quantities of work executed as prime contractor (in the same name) during the last 5 years specified in 1.2 above:

Year	Name of work	Name of Employer	Quantity of work performed (Cum)			Remarks (Indicate contract reference
			SW Line	Manholes	Earthworks	
2018-19						
2019-20						
2020-21						
2021-22						
2022-23						

1.4 Information on works for which tenders have been submitted and works which are yet to be completed as on the date of this Tender.

(A)Existing commitments and on-going works:

Description of work	Place and state	Contract No. & Date	Name & address of employer	Value of contract (Rs.Lakhs)	Specified period of completion	Value of works * remaining to be completed (Rs.Lakhs)	Anticipated date of completion
1	2	3	4	5	6	7	8

*Attach certificate from Engineer-in-Charge

(B)Works for which Tenders already submitted:

Description of work	Place & state	Name & address of employer	Estimated Value of works (Rs.Lakhs)	Stipulated period of completion	Date when decision id expected	Remarks if any
1	2	3	4	5	6	7

1.5 The following items of equipments are considered essential for successfully carrying out the works. The tenderer should furnish all the information listed below.

Item fo Equipment	No	Required capacity	Owned	Owned and available		Remarks
				Number/ Capacity	Age/ Condition	

1.6 Report on the financial standing of the tenderer, such as profit and loss statements and
auditor's reports for the five years;

1.7 Qualification and experience of the key technical and management personnel in permanent employment with the tenderer and those that are proposed to be deployed on this contract, if awarded.

1.8 Name, address, and telephone, telex, and fax numbers of the Tenderers bankers who may
provide references if contacted by the Employer.

1.9 Evidence of access to financial resources to meet the qualification requirements specified in ITT Clause 3.3 (b): Cash in hand, Letter of Credit etc., List them below and attach certificate from the Banker in the suggested format as under:

BANKER'S CERTIFICATE

This is to certify that M/s…… is a reputed company with a good financial standing. If the contract for this work, Namely……(Name of the work) is awarded to the above firm, we shall be able to provide over draft / credit facilities to the extent of Rs…… To meet the working capital requirement for executing the above contract.

Sd/-
Name of the Bank, Senior Bank Manager
Address :

1.11 Proposals for sub contracting components of works amounting to more than 20% of the contract price

Item of Work	Value of Sub-contract	Identified sub-contractor (Name & Address)	Experience of similar work(attach certificate from the respective employer)
1	2	3	4

1.12 Information on the litigations in which the Tender is involved:

Other	Employer	Details of	Amount	Remarks showing present

Party(ies)		Dispute	Involved	status
1	2	3		4

SECTION 3: FORMS OF TENDER, LETTER OF ACEPTANCE, NOTICE TO PROCEED WITH THE WORK AND AGREEMENT FORM

Letter of Acceptance

(letterhead paper of the Employer)

_____[date]

To:

_____[name and address of the Contractor]

Gentleman,

This is to notify you that your Tender dated _____ for execution of the _____ _____ [name of the contract and identification number, as given in the Instructions to Tenderers] for the Contract Price of Rupees —— _____ (_____) [amount in words and figures], as corrected and modified in accordance with the Instructions to Tenderers is hereby accepted by our Agency.

You are hereby requested to furnish Security deposit, in the form detailed in Para 24.1 of ITT for an amount of Rs.——————— within 20 days of the receipt of this letter of acceptance valid up to 30 days from the date of expiry of Defects Liability Period i.e. up to ..... and sign the contract, failing which action as stated in Para 24.5 of ITT will be taken.

Yours faithfully,

Authorized Signature
Name and Title of Signatory
Name of Agency

WORK ORDER

(letterhead of the Employer)

——————— (date)

To

——————————————————— (name and address of the Contractor)
———————————————————
———————————————————

Gentleman

Pursuant to your furnishing the requisite Security deposit as stipulated in ITT Clause 24.1 and signing of the contract agreement for the Work of Providing & laying of 230mm dia SW line at Doddanna Estate 5th, 6th, 8th & 9th cross coming under Peenya Service station area of AEENW-2 Sub Divisiona Tender Price of Rs.————————, you are hereby instructed to proceed with the execution of the said works in accordance with the contract documents and under the guidance of AEENW-2

Yours faithfully,

(Signature, name and title of signatory authorized to sign on behalf of Employer)

Agreement Form

Agreement

This agreement, made the _____day of _____20_____, between_____ _____[name and address of Employer] (hereinafter called "the Employer") of the one part and _____ _____ _____[name and address of contractor] (hereinafter called "the Contractor") of the other part.

Whereas the Employer is desirous that the Contractor execute_____ _____ _____ _____[name and identification number of Contract] (hereinafter called "the Works") and the Employer has accepted the Tender by the Contractor for the execution and completion of such Works and the remedying of any defects therein at a contract price of Rupees.....

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this Agreement, words and expression shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to, and they shall be deemed to form and be read and construed as part of this Agreement.
2. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy any defects therein in conformity in all aspects with the provisions of the Contract.
3. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying the defects wherein the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.
4. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz:
   i) Letter of Acceptance;
   ii) Notice to proceed with the works;
   iii) Contractor's Tender;
   iv) Contract Data;
   v) Conditions of contract (including Special Conditions of Contract);
   vi) Specifications;
   vii) Drawings;
   viii) Bill of Quantities; and
   ix) Any other document listed in the Contract Data as forming part of the contract.
5. Jurisdiction of Court/Arbitration:
   The sitting of arbitration shall be held at Bangalore only and nowhere else.
6. Dispute of any kind arising out of the contract shall be resolved within the jurisdiction of Bangalore city only and the parties agree and clearly understand that the Courts/Tribunals situated at Bangalore Metropolitan City have exclusive jurisdiction for the redressal of the disputes arising out of the contract and at no other place.
7. The parties further agree and understand that the place or places of issue of bank guarantee other than Bangalore will have no jurisdiction to resolve dispute of any kind relating to enforcement of the bank guarantees submitted by the contractor at Bangalore for the execution of the contract at Bangalore.
8. The contractor shall comply with all the legal requirements in the matter of employment of workmen and provide all safety gadgets to the workmen while working in the hazards place or conditions during the execution of the contract.

9. Contractor shall be fully responsible in the event of death of employee/workmen during the execution of the work and liable to pay adequate compensation to the dependants of employee/workman as per law.
10. On his/their failure, if the Board is made to pay compensation the same shall be recovered by the Board from the contractor out of the amounts due to the contractor or by appropriate legal action.
11. If death of any employees occurs during execution of work due to negligence of contractor, the contract will be liable for termination.
12. In the event of such termination, the employer may consider blacklisting of firm after due notice.
13. In case of any death or accident the contract will be cancelled after following due process.
14. The Board will be entitled to claim exemplary damages from the contractor in case of death of any work man/employees of the contractor in any of the BWSSB works as it damages the reputation of the Board.
15. Precautionary measures such as barricades, red/caution taps along with safety equipments to the labours to be provided during executions as per the memorandum issued by Chairman 3364/31.12.15.
16. The road cutting should be taken up through road cutting machine only. If manual cutting is found the concerned firm/contractor will be penalized.
17. The work should be executed in accordance with the contract document and as per the guidelines in the "Draft Safety Manual for construction and maintenance of UGD Lines and septic tanks in Urban Areas- 2013". Any lapses in following the safety guidelines, the contractor/agency/firm will be held solely responsible.
18. The rules and order regarding blasting operations has been read by me and I agreed to carryout blasting in full confo*r*mity with the rules and orders and hold myself responsible for their proper observance**.**
19. In accordance with condition of the Contract and in consideration of payment being made for the quality of work executed at the sanctioned estimated rate.

In witness where of the parties thereto have caused this Agreement to be executed the day and year first before written.

Signed, Sealed and Delivered by the contractor on day of 2022

IN WITNESS WHERE OF the parties have executed this Agreement by their signature.

SIGNED by:	SIGNED by:
For and on behalf of the Employer in the Presence of	For and on behalf of the Contractor in the Presence of
Witness:	Witness :
Name :	Name :
Address:	Address :
Date :	Date :

Employer :
Contractor :

The details of Jurisdictions of the courts and safety measures included in the contract agreement are as mentioned in Annexure – A

SECTION 4: CONDITIONS OF CONTRACT

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Conditions of Contract

A. General

1. Definitions

1.1 Terms which are defined in the Contract Data are not also defined in the Conditions of Contract but keep their defined meanings. Bold letters are used to identify defined terms.

Bill of Quantities means the priced and completed Bill of Quantities forming part of the Tender.
Compensation events are those defined in Clause 34 hereunder.

The **Completion Date** is the date of completion of the Works as certified by the Employer in accordance with Sub Clause 38.1.

The **Contract** is the contract between the Employer and the Contractor to execute, complete and maintain the Works. It consists of the documents listed in Clause 2.3 below.

The **Contract Data** defines the documents and other information which comprise the Contract.

The **Contractor** is a person or corporate body whose Tender to carry out the Works has been accepted by the Employer.

The **Contractor's Tender** is the completed Tender document submitted by the Contractor to the Employer.

The **Contract price** is the price stated in the Letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.

Days are calendar days; **months** are calendar months.

A **Defect** is any part of the Works not completed in accordance with the Contract.

The **Defects liability period** is the period named in the Contract Data and calculated from the Completion Date.

The **Employer** is the party who will employ the Contractor to carry out the Works.

Equipment is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.

The **Initial Contract price** is the Contract Price listed in the Employer's Letter of Acceptance.

The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the Contract Data. The Intended Completion Date may be revised only by the Employer by issuing an extension of time.
Materials are all supplies, including consumables, used by the contractor for incorporation in the Works.

Plant is any integral part of the Works which is to have a mechanical, electrical, electronic or chemical or biological function.

The **Site** is the area defined as such in the Contract Data.
Specification means the Specification of the Works included in the Contract and any modification or addition made or approved by the Employer.

The **Start Date** is given in the Contract Data. It is the date when the Contractor shall commence execution of the works. It does not necessarily coincide with any of the Site Possession Dates.

A **Subcontractor** is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract which includes work on the Site.

A **Variation** is an instruction given by the Employer which varies the Works.

The **Works** are what the Contract requires the Contractor to construct, install, and turn over to the Employer, as defined in the Contract Data.

2. Interpretation

2.1 In interpreting these Conditions of Contract, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning under the language of the

Contract unless specifically defined. The Employer will provide instructions clarifying queries about the Conditions of Contract.

2.2 The documents forming the Contract shall be interpreted in the following order of priority:

(1) Agreement
(2) Letter of Acceptance, notice to proceed with the works
(3) Contractor’s Tender
(4) Contract Data
(5) Conditions of Contract
(6) Specifications
(7) Drawings
(8) Bill of quantities and
(9) any other document listed in the Contract Data as forming part of the Contract.

3. Law governing contract

3.1 The law governing the Contract is the Laws of India supplemented by the Karnataka Local Acts.

4. Employer's decisions

4.1 Except where otherwise specifically stated, the Employer will decide contractual matters between the Employer and the Contractor.

5. Delegation

5.1 The Employer may delegate any of his duties and responsibilities to other people after notifying the Contractor and may cancel any delegation after notifying the Contractor.

6. Communications
6.1 Communications between parties which are referred to in the conditions are effective only when in writing. A notice shall be effective only when it is delivered (in terms of Indian Contract Act).

7. Subcontracting

7**.**1 The Contractor may subcontract with the approval of the Employer but may not assign the Contract without the approval of the Employer in writing. Subcontracting does not alter the Contractor's obligations.

8. Other Contractors

8.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Employer.

9. Personnel

9.1 The Contractor shall employ the technical personnel (of number and qualifications) as may be stipulated by GOK from time to time during the execution of the work. The technical staff so employed shall be available at site as may be stipulated by the Employer.

9.2 If the Employer asks the Contractor to remove a person who is a member of the Contractor's staff or his work force stating the reasons, the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.

10. Employer's and Contractor's risks

10.1 The Employer carries the risks which this Contract states are Employer's risks, and the Contractor carries the risks which this Contract states are Contractor's risks.

11. Employer's risks

11.1 The Employer is responsible for the excepted risks which are (a) in so far as rebellion, riot commotion or disorder or (b) a cause due solely to the design of the Works, other than the Contractor's design.

12. Contractor's risks

12.1 All risks of loss of or damage to physical property and of personal injury and death which arise during and in consequence of the performance of the Contract other than the excepted risks are the responsibility of the Contractor.

13. Queries about the Contract Data

13.1 The Employer will clarify queries on the Contract Data.

14. Contractor to construct the Works

14.1 The Contractor shall construct the Works in accordance with the Specification and Drawings.

15. The Works to be completed by the Intended Completion Date

15.1 The Contractor may commence execution of the Works on the Start Date and complete them by the Intended Completion Date.

16. Safety

16.1 The Contractor shall be responsible for the safety of all activities on the Site.

17. Discoveries

17.1 Anything of historical or other interest or of significant value unexpectedly discovered on the Site is the property of the Employer. The Contractor is to notify the Employer of such discoveries and carry out the Employer's instructions for dealing with them.

18. Possession of the Site

18.1 The Employer shall give possession of all parts of the Site to the Contractor. If possession of a part is not given by the date stated in the Contract Data the Employer is deemed to have delayed the start of the relevant activities and this will be Compensation Event.

19. Access to the Site

19.1 The Contractor shall allow the Employer and any person authorized by the Employer access to the Site, to any place where work in connection with the Contract is being carried out or is intended to be carried out and to any place where materials or plant are being manufactured / fabricated / assembled for the works.

20. Instructions

20.1 The Contractor shall carry out all instructions of the Employer which comply with the applicable laws where the Site is located.

B. Time Control

21. Program

21.1 Within the time stated in the Contract Data the Contractor shall submit to the Employer for approval a Program showing the general methods, arrangements, order, and timing for all the activities in the Works.

21.2 The Employer's approval of the Program shall not alter the Contractor's obligations. The Contractor may revise the Program and submit it to the Employer again at any time. A revised Program is to show the effect of Variations and Compensation Events.

22. Extension of the Intended Completion Date

22.1 The Employer shall extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date.

22.2 The Employer shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Employer for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information.

23. Delays ordered by the Employer

23.1 The Employer may instruct the Contractor to delay the start or progress of any activity within the Works.

24. Management meetings

24.1 The Employer may require the Contractor to attend a management meeting. The business of a management meeting shall be to review the progress achieved and the plans for remaining work.

24.2 The responsibility of the parties for actions to be taken is to be decided by the Employer either at the management meeting or after the management meeting and stated in writing to be distributed to all who attended the meeting.

C. Quality Control

25. Identifying defects

25.1 The Employer shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Employer may instruct the Contractor to search for a Defect and to uncover and test any work that the Employer considers may have a Defect

26. Tests

26.1 If the Employer instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no Defect the test shall be a Compensation Event.

27. Correction of defects

27.1 The Employer shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion and is defined in the Contract Data. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.

27.2 Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Employer’s notice.

28. Uncorrected defects

28.1 If the Contractor has not corrected a Defect within the time specified in the Employer’s notice, the Employer will assess the cost of having the Defect corrected, and the Contractor will pay this amount.

D. Cost Control

29. Bill of Quantities (BOQ)

29.1 The BOQ shall contain items for the construction, installation, testing, and commissioning

29.2 The BOQ is used to calculate the Contract Price. The Contractor is paid for the quantity of the work done at the rate in the BOQ for each item

30. Variations

30.1 The Employer shall have power to order the Contractor to do any or all of the following as considered necessary or advisable during the progress of the work by him

(a) Increase or decrease of any item of work included in the Bill of Quantities (BOQ);

(b) Omit any item of work;

(c) Change the character or quality or kind of any item of work;

(d) Change the levels, lines, positions and dimensions of any part of the work;

(e) Execute additional items of work of any kind necessary for the completion of the works; and

(f) Change in any specified sequence, methods or timing of construction of any part of the work.

30.2 The Contractor shall be bound to carry out the work in accordance with any instructions in this connection, which may be given to him in writing by the Employer and such alteration shall not vitiate or invalidate the contract.

30.3 Variations shall not be made by the Contractor without an order in writing by the Employer, provided that no order in writing shall be required for increase or decrease in the quantity of an item appearing in the BOQ so long as the work executed conforms to the approved drawings.

30.4 The Contractor shall promptly request in writing the Employer to confirm verbal orders and if no such confirmation is received within 15 days of request, it shall be deemed to be an order in writing by the Employer.

31. Payments for Variations

31.1 Payment for increase in the quantities of an item in the BOQ up to 25% of that provided in the Bill of Quantities shall be made at the rates quoted by the Contractor.

31.2 For quantities in excess of 125% of the tendered quantity of an item as given in the BOQ, the Contractor shall be paid at the rate entered in or derived from, in the Schedule of Rates (applicable for the area of the work and current at the time of award of contract) plus or minus the overall percentage of the original tendered rates over the current Schedule of Rates prevalent at the time of award of contract.

31.3 If there is no rate for the additional, substituted or altered item of the work in the BOQ, efforts would be made to derive the rates from those given in the BOQ or the Schedule of Rates (applicable for the area of the work and current at the time of award of contract) and if found feasible the payment would be made at the derived rate for the item plus or minus the overall percentage of the original tendered rates over the current Schedule of Rates prevalent at the time of award of contract

31.4 If the rates for additional, substituted or altered item of work cannot be determined either as at 31.1, 31.2 or 31.3 above, the Contractor shall be requested to submit his quotation for the items supported by analysis of the rate or rates claimed, within 7 days.

31.5 If the Contractor's quotation is determined unreasonable, the Employer may order the Variation and make a change to the Contract Price which shall be based on Employer’s own forecast of the effects of the Variation on the Contractor's costs.

31.6 f the Employer decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.

31.7 Under no circumstances the Contractor shall suspend the work on the plea of non-settlement of rates for items falling under this Clause.

32. Submission of bills for payment

32.1 The Contractor shall submit to the Employer monthly bills of the value of the work completed less the cumulative amount paid previously.

32.2 The Employer shall check the Contractor's bill and determine the value of the work executed which shall comprise of (i) value of the quantities of the items in the BOQ completed and (ii) valuation of Variations and Compensation Events.

32.3 The Employer may exclude any item paid in a previous bill or reduce the proportion of any item previously paid in the light of later information.

33. Payments

33.1 Payments shall be adjusted for deductions for retention, other recoveries in terms of the contract and taxes, at source, as applicable under the law. The Employer shall pay the Contractor the within 60 days of submission of bill.

33.2 Items of the Works for which no rate or price has been entered in will not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.

34. Compensation events

34.1 The following are Compensation events unless they are caused by the Contractor:

(a) The Employer does not give access to a part of the Site by the Site Possession Date stated in the Contract Data.
(b) The Employer orders a delay or does not issue drawings, specifications or instructions required for execution of works on time.
(c) The Employer instructs the Contractor to uncover or to carry out additional tests upon work which is then found to have no Defects.
(d) The Employer gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons.
(e) The effect on the Contractor of any of the Employer’s Risks.
(f) The Employer unreasonably delays issuing a Certificate of Completion.
(g) Other Compensation Events listed in the Contract Data or mentioned in the Contract.

34.2 If a Compensation Event would cause additional cost or would prevent the work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date is extended. The Employer shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.

34.3 As soon as information demonstrating the effect of each Compensation event upon the Contractor's forecast cost has been provided by the Contractor, it is to be assessed by the Employer and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Employer shall adjust the Contract Price based on Employer’s own forecast. The Employer will assume that the Contractor will react competently and promptly to the event.

34.4 The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor not having given early warning or not having cooperated with the Employer.

35. Tax

35.1 The rates quoted by the Contractor shall be deemed to be inclusive of the sales and other taxes that the Contractor will have to pay for the performance of this Contract. The Employer will perform such duties in regard to the deduction of such taxes at source as per applicable law.

36. Liquidated damages

36.1 The Contractor shall pay liquidated damages to the Employer at the rate per day stated in the Contract Data for each day that the Completion Date is later than the Intended Completion Date. The total amount of liquidated damages shall not exceed the amount defined in the Contract Data. The Employer may deduct liquidated damages from payments due to

the Contractor. Payment of liquidated damages does not affect the Contractor's liabilities.

36.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Employer shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment of bill.

37. Cost of repairs

37.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.

E. Finishing the Contract

38. Completion

38.1 The Contractor shall request the Employer to issue a Certificate of Completion of the Works and the Employer will do so upon deciding that the Work is completed.

39. Taking over

39.1 The Employer shall take over the Site and the Works within seven days of issuing a certificate of Completion.

40. Final account

40.1 The Contractor shall supply to the Employer a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Employer shall issue a Defect Liability Certificate and certify any final payment that is due to the Contractor within 90 days of receiving the Contractor's account if it is correct and complete. If it is not, the Employer shall issue within 90 days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Employer shall decide on the amount payable to the Contractor and make payment within 60 days of receiving the Contractor’s revised account.

41. As built drawings

41.1 “as built” Drawings[17] to be submitted by the contractor, the Contractor shall supply them by the dates stated in the Contract Data.

41.2 If the Contractor does not supply the Drawings by the dates stated in the Contract Data, or they do not receive the Employer’s approval, the Employer shall withhold the amount stated in the Contract Data from payments due to the Contractor.

42. Termination

42.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.

42.2 Fundamental breaches of Contract include, but shall not be limited to the following:

(a) the Contractor stops work for 45 days when no stoppage of work is shown on the current Program and the stoppage has not been authorized by the Employer;
(b) the Employer instructs the Contractor to delay the progress of the Works and the instruction is not withdrawn within 60 days;
(c) The Contractor becomes bankrupt or goes into liquidation other than for a reconstruction or amalgamation;
(d) a payment due to the Contractor is not paid by the Employer within 90 days of the date of the submission of the Bill by Contractor;
(e) the Employer gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Employer;
(f) the Contractor does not maintain a security which is required;
(g) the Contractor has delayed the completion of works by the number of days for which the maximum amount of liquidated damages can be paid as defined in the Contract data; and
(h) if the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices in competing for or in the executing the Contract.

For the purpose of this paragraph : “corrupt practice” means the offering, giving, receiving or soliciting of any thing of value to influence the action of a public official in the procurement process or in contract execution. “Fraudulent practice” means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Borrower, and includes collusive practice among Tenderers (prior to or after Tender submission) designed to establish Tender prices at artificial non-competitive levels and to deprive the Borrower of the benefits of free and open competition.”

42.3 When either party to the Contract gives notice of a breach of contract to the Employer for a cause other than those listed under Sub Clause 42.2 above, the Employer shall decide whether the breach is fundamental or not.

42.4 Notwithstanding the above, the Employer may terminate the Contract for convenience.

42.5 If the Contract is terminated the Contractor shall stop work immediately, make the Site safe and secure and leave the Site as soon as reasonably possible.

43. Payment upon Termination

43.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Employer shall prepare bill for the value of

the work done less advance payments received up to the date of the bill, less other recoveries due in terms of the contract, less taxes due to be deducted at source as per applicable law and less the percentage to apply to the work not completed as indicated in the Contract Data. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor the difference shall be a debt payable to the Employer.

43.2 If the Contract is terminated at the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Employer shall prepare bill for the value of the work done, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works and less advance payments received up to the date of the certificate, less other recoveries due in terms of the contract, and less taxes due to be deducted at source as per applicable law and make payment accordingly.

44. Property

44.1 All materials on the Site, Plant, Equipment, Temporary Works and Works are deemed to be the property of the Employer, if the Contract is terminated because of a Contractor’s default.

45. Release from performance

45.1 If the Contract is frustrated by any event entirely outside the control of either the Employer or the Contractor the Employer shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which commitment was made.

F. Special Conditions of Contract

1. **Labour :**

The Contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or other, and for their payment, housing, feeding and transport.

The Contractor shall, if required by the Employer, deliver to the Employer a return in detail, in such form and at such intervals as the Employer may prescribe, showing the staff and the numbers of the several classes of labour from time to time employed by the Contractor on the Site and such other information as the Employer may require.

2. **Compliance with labour regulations:**

During continuance of the contract, the Contractor and his sub contractors shall abide at all times by all existing labour enactments and rules made there under, regulations, notifications and bye laws of the State or Central Government or local authority and any other labour law (including rules),

regulations, bye laws that may be passed or notification that may be issued under any labour law in future either by the State or the Central Government or the local authority. The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contravention of any of the provisions of any Act or rules made there under, regulations or notifications including amendments. If the Employer is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/regulations including amendments, if any, on the part of the Contractor, Employer shall have the right to deduct any money due to the Contractor including his amount of security deposit. The Employer shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.

The employees of the Contractor and the Sub-Contractor in no case shall be treated as the employees of the Employer at any point of time.

3. **Protection of Environment:**

The contractor shall take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of his methods of operation. During continuance of the contract, the contractor and his sub-contractors shall abide at all times by all existing enactments on environmental protection and rules made there under, regulations, notifications and bye-laws of the State or Central Government, or local authorities and any other law, bye-law, regulations that may be passed or notification that may be issued in this respect in future by the State or Central Government or the local authority.

[Add other Clauses specific to the work for which tenders are invited.]

SECTION 5: CONTRACT DATA

Items marked "N/A" do not apply in this Contract.

The following documents are also part of the Contract: **Clause Reference**

The Employer is :

Name : Engineer in Chief , BWSSB,

Address: 2nd Floor,
Cauvery Bhavan,
K G Road,
Bangalore - 560 009,
Phone: 080 - 22945105

Name of authorized Representative: Executive Engineer,
North West – 1 Division
West of Chord Road, 2nd Stage,
Bangalore-560086

The name and identification number of the Contract is:

Providing and laying 300mm dia RCC NP3 sewer line fromMahalakshmi Entrance to
Panchamukhi Temple Mahalakshmi Layout coming under Mahalakshmi Layout service station
area of AEENW-1 Sub Division

No: BWSSB / EE (NW)-1 / PB / /2024-25 Date :

The works consist ofItem as in Shedule Band the work should be carried out under the instruction of AEENW-2

The start date shall be the date of issue of notice to proceed with the work. [1.1]

The Intended Completion Date for the whole of the Works is 3 months from date of issue of work order[18] [15, 22]

The Site Possession Date is: [19] [18] Date of work order

The Site is located at: fromMahalakshmi Entrance to Panchamukhi Temple MahalakshmiLayout coming under Mahalakshmi Layout service station area of AEENW-1 Sub Division

The Defects Liability Period is **365** days.[20] [27]

The liquidated damages for the whole of the works are
Rs.0.1% of contract price per day

The maximum amount of liquidated damages for the whole of the works is **10%** of final contract price

[18] At the time of preparation of the tender document give the period required for completion of work. When the Agreement is drawn after award of the contract, the dates can be put in.

[19] At the time of preparation of the tender document give the period after the issue of work order, when the site would be made available to the contractor for example 'one week after the issue of work order'.

[20] The period should depend upon the period required for testing of the work. In case of building it could be 12 months (passing of one rainy season); for pipe laying work, tanks, water retaining structures, the time required for testing; for canals, lining works, the passing of one monsoon or running of canal whichever is lower; roads and highways passing of one monsoon (12 months)

[21] The amount is usually computed on the basis of 0.1% the contract price per day. The amount has to be specified as a round figure nearest to the hundred.
The maximum amount of liquidated damages for the whole of the works [36] is ten percent of final contract price.

The date by which "as-built" [22]drawings (in scale ...) in 2 sets are required is within 30 days of issue of certificate of completion .. [41]

The amount to be withheld for failing to supply "as built"[23] drawings by the date required is
Rs.1,00,000/-. [41]

The following events shall also be fundamental breach of the contract : [42.2]

1. The contractor has contravened Sub-clause 7.1 and Clause 9 of CC.

The percentage to apply to the value of the work not completed representing the Employer's [43.1]

additional cost for completing the Works shall be **30**percent.

[22] Completion drawings

[23] The amount should be sufficient to get the completion drawings prepared by alternative agency in case the contractor fails to submit.

[24] Change if need be. It should be sufficient to get the balance works completed by alternative agency.

Executive Engineer (NW)-1
Bangalore Water Supply & Sewerage Board
West of Chord road, 2nd Stage,
Bangalore -560086.

SECTION 6: SPECIFICATIONS Technical Specifications

1.1. Scope Of Work.

The scope of work under this contract shall be as detailed above and as specified in Bill of Quantities in Section-7,

1.2. contractual requirements

1.2.1. Contractor's Inspection of Sites:

The Contractor is deemed to have visited the sites and familiarized himself of the conditions and restrictions under which the work will be executed. The omission of any details shall not relieve the Contractor of his prima facie obligation and responsibility under the Contract to carry out and successfully complete the rehabilitation works. The Employer will entertain no monetary or other claims, made by the Contractor on the grounds of 'want of knowledge'.

THE CONTRACTOR IS ADVISED THAT IT IS HIS SOLE RESPONSIBILITY TO ASCERTAIN FOR HIMSELF THE EXTENT OF WORK THAT IS REQUIRED TO BE DONE IN SITE AND TO GENERALLY OBTAIN HIS OWN INFORMATION ON ALL MATTERS AFFECTING DIRECTLY OR INDIRECTLY THE EXECUTION OF THE WHOLE WORKS INVOLVED IN THE CONTRACT TO THE COMPLETE SATISFACTION OF THE ENGINEER. THE ENGINEER WILL ENTERTAIN NO CLAIM OF EXTRAS IN CONSEQUENCE OF ANY ALLEGED IGNORANCE IN ANY ASPECT. IT MUST BE CLEARLY AND DEFINITELY UNDERSTOOD THAT THE CONTRACTOR SHALL BE HELD SOLELY RESPONSIBLE FOR MAKING ALL NECESSARY ARRANGEMENTS AND COORDINATING WITH RELEVANT AUTHORITIES, COMPETENT AGENCIES AND SPECIALISTS ETC., TO ENSURE SATISFACTORY COMPLETION OF THE CONTRACT.

1.2.2. Tender Drawings and Contract Documents: NA

1.2.3. Time of completion.

Time period for completion of all the works shall be 2 Months (inclusive of monsoon period) from the date of issue of notice to commence. Within this period Contractor shall be required to complete the works, including testing, commissioning and completion of the three months Trial run period.

1.2.4. Work plan.

The Contractor shall prepare the work plan for the execution of works, which includes procurement of pipes before starting of the works. The Contractor shall submit the planning's (Construction, Financial, Quality and Commissioning and handing over planning's) within 14 days after issue of letter of acceptance and take necessary approvals for the same. The planning's shall be in the form of a PERT/CPM and a bar chart together with description of his proposed method of working. The planning shall include all allowances to guard against delays caused due to inclement weather or its effects (such as floods or draughts), fire or industrial disputes, unless such events could not reasonably have been foreseen by an experienced Contractor.

1.2.5. Alignment Survey and the L-Sections.

The contractor shall carry out the Survey work for laying of lateral sewers (less than 300 mm diameter) for proposed alignment and levels, at every 30 meters interval and other necessary locations, before execution of the work, including all data required for generating L section and GIS maps of sewer network. Contractor shall submit the survey drawings showing L-Sections, ground levels at every 30 meters interval and other necessary locations, detailed strip plans showing adjacent structures etc., in latest version of AutoCAD for approval of the Engineer before execution of the work. The Bidder has to consider this aspect and make provision, while quoting the rates for Sewer pipe

(less than 300mm), supply, laying and jointing item in the tender. If the alignment and flow directions of the sewers are to be changed according to the site conditions and the Engineer In-charge agrees to that, the contractor has to redo the alignment and level survey at every 30m and junction points, and submit all the details in latest version of Auto Cad in soft form to BWSSB, for re-design of that particular stretch and take up the work on receipt of approved designs from BWSSB.

Also, The contractor shall carry out the Survey work for laying of branch / submain /main / trunk sewers (230 mm diameter & above) for proposed alignment and levels, at every 30 meters interval and other necessary locations, before execution of the work, including all data required for generating L section and GIS maps of sewer network. Contractor shall submit the survey drawings showing L-Sections, ground levels at every 30 meters interval and other necessary locations, detailed strip plans showing adjacent structures etc., in latest version of AutoCAD for approval of the Engineer before execution of the work. The contractor shall take prior approval for location and length of the survey work for this paid item. The payment will be made as per the quoted rates for conducting survey in bill of quantities. If the alignment and flow directions of the sewers are to be changed according to the site conditions and the Engineer In-charge agrees to that, the contractor has to redo the alignment and level survey at every 30m and junction points, and submit all the details in latest version of Auto Cad in soft form to BWSSB, for re-design of that particular stretch and take up the work on receipt of approved designs from BWSSB.

The alignments, L-section and location of manholes may be changed at site if required, and after approval of the Engineer.

The Survey work for all the sewer lines (for all diameters of sewers) alignment shall also include the following,

a) All the Survey works shall be carried out from G.T.S. Benchmarks, using Total Station instrument of standard make, and by qualified survey personnel. The survey shall consist of field data collection and related attribute information collection of all the aspects pertaining to GIS mapping of sewer network before and after laying of sewer pipes and allied structures, as required by BWSSB.

b) Field attribute collection for Mapping with respect to Existing sewerage network does not require any digging in the field. The existing maps / BWSSB field staff knowledge can be utilized by the bidder to provide the data for mapping the said

network and it will be paid as per the survey work item in Bill of quantities.

c) Network entity's attribute information like pipe dia, pipe type, ground material, depth of the pipe, manhole type, manhole size, manhole depth etc. shall be submitted.

d) The data pertaining to House Service Connections (connection to consumers) have to be collected up to building footprint and submitted.

e) The contractor shall communicate regularly, with the BWSSB regarding the GIS mapping survey data and for clarifications.

The Contractor shall, within 21 days after the date of the Letter of Acceptance, submit to the Engineer for his consent a detailed description of the arrangements for conducting the quality control program during execution of the Works, including details of his testing Laboratory, equipment, staff and general procedures. If following submission or at any time during the progress of Works, it appears to the Engineer that the Contractor's quality control programme is not adequate to ensure the quality of the Works, the Contractor shall produce a revised program as desired by the Engineer, which will be adequate to ensure satisfactory quality control.

a. Tests during Construction : NA

b. Third Party Inspections : NA

1.2.9. Sign Board

The Contractor shall provide sign boards at the sites of the Works of approved size and design as directed by the Engineer, which provides (i) the name of the Project and the financing agency (World Bank loan); (ii) the names and addresses of the Employer, Contractor and Consultants; (iii) short description of the Project, (iv) the Contract amount (v) the starting and completion dates.

Such sign boards shall be located at specified places in the project coverage area as directed by the Engineer. Contractor shall take care of signboard and replace it in case of loss, damage, theft etc., the sign boards may be in English or Kannada or in both as directed by the Engineer.

1.2.10. Protection of Utilities

The Contractor is required to examine carefully the locations of the works and their alignments. Contractor is to make enquiries and co-ordinate with all the departments /authorities concerning all utility lines such as water pipes, sewers, gas pipe, telephone (underground and /or overhead) lines, optic fibre cables, electric and telecommunication cables (underground and /or overhead) , any other utility lines etc; to determine and verify to his

satisfaction the character, sizes, position and lengths of such utilities from authentic records.

The Contractor shall be wholly responsible for the protection of such utilities as may be required, and shall not make any claim for extra work or extra time that may be required to protect such utilities. Any damage, to the Utilities shall be restored/ repaired at Contractor's own cost. Shifting of any utilities if required will be taken up by BWSSB or any other agency separately after site inspection.

In case the alignment of the pipeline crosses the high tension electrical transmission lines belonging to the KPTCL / BESCOM or other authorities/ departments, the Contractor shall take all precautions necessary to see that the work is carried out with care and safety, without disturbing such transmission lines. The Contractor will be responsible to carry out all construction activities in such reaches in consultation with the owners of such facilities. However, satisfactory completion of the entire work will be the responsibility of the Contractor.

1.2.11. Performance Requirements:

The performance requirements have been spelt out in various parts of the Contract specification. The Contractor shall ensure that, he fully understands and complies with all the requirements specified in the Contract. However, in the event of any conflicting performance requirements spelt out in the documents, the Contractor shall promptly bring such matters in writing to the attention of the Engineer for Engineers decision. The Engineer's decision will be conveyed to the Contractor in writing and which is final. The Contractor shall fully comply with Engineer's decision on the matter.

The Contractor is deemed to have read and understood all performance requirements before bidding and he shall have no claim whatsoever with respect to the Engineer's final decision on the matter.

1.2.12. Contractor's Obligations:

The Clauses in this section are meant to provide general guidelines and Compliance requirements to the Contractor. It does not however relieve the Contractor from taking every other step and precautions as deemed necessary to complete the works successfully within the specified Contract period and bid amount. Also, compliance to the approved Environmental management plan and monitoring the same is part of the contract.

12.12.1. Environmental Management Plan and Monitoring.

The Contractor shall be responsible for the mitigation measures to be taken for complying to the Environmental management plan and monitor as described below,

1.2.14. Special Traffic Precautions.

Contractors Attention is specially drawn to the requirements by the traffic police and road authorities and specification regarding traffic control, access and reinstatement of road surface. It is necessary to obtain permission from traffic Inspector of Police prior to taking up any stretch of road for excavation and sewer laying. It is necessary to carry out the work in such a manner as to cause minimum interference with the public use of roads, footpaths and other thoroug

1.2.15. Working in Restricted areas.

In addition to the clause stated in other section of the special specification the Contractor shall determine prior to constructing the lengths of sewers where access to properties commercial, domestic and institutional will be restricted.

The identification of these areas shall be agreed in consultation with the Engineer, Police and Urban local body. In this case it may be necessary to operate one-way traffic system or to close roads. The Contractor shall be responsible for liaising with the police and other local representatives to obtain permission to close roads or restrict traffic movement. No additional time will be allowed for these pre-construction activities. Where roads are closed alternative routes are to be determined in conjunction with the authorities. Sign Boards are to be placed at both junctions of the route indicating “ROAD CLOSED & WORK UNDER PROGRESS”. The expense for the same shall be borne by the contractor. The Contractor shall discuss these arrangements with the occupants of houses affected to ensure that their disruption is kept to a minimum. The Contractor is to offer assistance to residents who are infirm or need special arrangements for access during construction.

In narrow roads and streets it may not be possible to operate excavation machinery in such cases hand excavation is to be done. The method of operation, length of sewer to be excavated, method of barricading, property access, dewatering, shoring, pipe laying, backfilling and road reinstatement shall be stated in a ‘Method Statement’ to be submitted at least 4 weeks before work is scheduled to commence in a particular location. The written agreement of the

Engineer shall be obtained to the method statement. If any additional safeguards are required by the Engineer these shall be incorporated in the method statement at no extra cost and the method statement is to be resubmitted.

The Contractor will ensure that the noise created by his activities is suppressed. Adequate silencers fitted to construction machinery, particularly compressors and drills. Dust is to be kept to a minimum by using water sprinklers. Utility service connections shall be maintained to every property throughout the construction phase and thereafter. If any defect/ damage is caused it shall be repaired immediately and at the Contractors expense. The disruption to the normal activities of residents and other members of the public is to be kept to an absolute minimum. Providing adequate noise control and other nuisances are kept to a minimum, extended working hours may be permitted with the agreement of the Engineer and local residents. No additional payment shall be made for any of these arrangements unless otherwise specified. Adequate lighting shall be provided by the Contractor at his cost if night working is adopted.

1.2.16. Interfaces with other packages.

If this contract Package will have interface with other contracts, the contractor shall only undertake the end connections of sewers at the interface points, after the sewer has passed the hydraulic test on completion of end connections. The contractor shall lay the bedding and backfill for sewers in normal manner.

1.2.17. Order Of Precedence Within Bid Documents

In the event there is any conflict or discrepancy within the Bidding documents, the order of Precedence will be determined as follows;

1. Addendum
2. Contract data
3. Instruction to Bidders
4. Invitation to Bid
5. General conditions contract including special conditions contract
6. Technical specifications
7. Bill of quantities.
8. Drawings

1.2.18. Technical and Supervisory Staff : NA

1.2.19 MEASUREMNTS& PAYMENTS.

1.2.19.1. MEASUREMENTS

a. Quantities

The quantities set out in the Bill of Quantities are the estimated quantities for the Works, and they are not be taken as the actual and correct quantities of the Works to be executed by the Contractor in fulfillment of his obligations under the Contract.

b. Works to be Measured

The Engineer shall, except as otherwise stated, ascertain and determine by measurement the value of the works in accordance with the contract and the contractor shall be paid that value in accordance with applicable clauses of this contract. The Engineer shall, when he requires any part of the works to be measured, give reasonable notice to the Contractor's authorized agent, who shall:

a) forthwith attend or send a qualified representative to assist the Engineer or his representative in making such measurement, and

b) supply all particulars required by the Engineer or his representative.

Should the Contractor not attend, or neglect or omit to send such representative, then the measurement made by the Engineer or his representative or approved by him shall be taken to be the correct measurement for such part of the works. For the purpose of measuring such Permanent Works as are to be measured by records and drawings, the Engineer shall prepare such records and drawings as the work proceeds as he deems necessary or appropriate and the Contractor, as and when called upon to do so in writing, shall within 14 days, attend to examine and agree such records and drawings with the Engineer and shall sign the same when so agreed. If after examination of such records and drawings, the contractor does not agree the same or does not sign the same as agreed, they shall nevertheless be taken to be correct, unless the Contractor, within 14 days of such examination, lodges with the Engineer notice of the respects in which such records and drawings are claimed by him to be incorrect. On receipt of such notice, the Engineer shall review the records and drawings and either confirm or vary them.

c. Method of Measurement

The Works shall be measured net, notwithstanding any general or local custom, except where otherwise provided for in the Contract.

1.2.19.2. PAYMENTS.

No part payments will be made for all items of works under this contract, except for pipeline works, which will be paid as mentioned in contract data.

2.0 EARTHWORK EXCAVATIONS.

2.1. General

The Earthwork Excavation for laying of sewers shall be carried out as per applicable IS specifications, specification in the Bill of quantities and applicable clauses in this specifications.

The Contractor shall make all excavations required for laying and jointing of the pipeline and construction of pertinent structures as required by the project. Except where otherwise required by the project or instructed by the Engineer, all excavation shall be in open cut, to the specified widths and depths with shoring, strutting and bracing. The Contractor is advised to satisfy himself and quote rates accordingly with regard to the likely conditions that may be met with during the execution of the works, with regard to the underground obstructions or conditions, necessary dewatering requirements including well point system or other means of dewatering the trenches before, during and after excavation, laying of bedding material, laying and jointing sewers, hydraulic testing and till backfilling, construction of manholes, pipe supports etc., in sub terrain under ground water, rain water, sewage and waste water etc.

Earth work excavation for pipeline trenches and manhole chambers including depositing on bank including, danger lighting and using sight rails and boning rods, including shoring, strutting, bailing out water at every 100 metres wherever necessary as directed in the various strata with lead upto 30 meters and all lifts etc., complete. A minimum of three numbers of sight rails are to be maintained at all times during pipe laying between manholes, including barricading as per directions of Engineer In-charge of work. (The Excavation cost should include the cost of shoring, strutting to facilitate for laying, jointing & testing of sewers, manholes.)

2.2. Classification of Excavation

i). All Soils includes the following,

a). Soft clay, soft murrum, gravel shale etc. including. Stiff heavy clay, hard shale or compact murrum requiring drifting tool or pick axe or both and shovel closely applied.

b). Gravel, soft laterite, kankar and cobble stone having maximum diameter in anyone direction between 75 mm and 300 mm.

c). Soling of road paths etc., and hard core.

d). Macadam surfaces such as water-bound and bitumen/tar bound.

e). Lime concrete, stone masonry in lime/cement mortar below ground level.

f). Soft Conglomerate, where the stones may be detached from the matrix with pick axe.

g). Generally any material which requires the close application of pick axe or scarifiers to loosen and not offering resistance to digging, greater than that offered by the hardest of any soil mentioned above.

ii). D.I.R. soft rock and medium hard rock includes,

a). Ordinary rock comprising of lime stone, sand stone, hard laterite fissured rock, conglomerate or other soft or disintegrated rock which may be quarried or split with crow bars.

b). Un-reinforced cement concrete which may be broken up with crow bars or pick axe and stone masonry in cement mortar below ground level.

c). Boulders which do not require blasting having maximum diameter in any direction of more than 300 mm; found lying loose on the surface or embedded in river bed, soil, talus, slope wash, and terrace material of dissimilar origin.

d). Hard laterite does not require blasting. It is to be classified under ordinary rock which does not require blasting.

iii). Hard Rock includes,

a). Any rock or cement concrete or RCC, excavation of which require the use of mechanical equipment or chiselling.

2.2.1. All soils.

The Earth work excavation in all soils, including the ones mixed with boulders of up to 30 cms size, includes excavation both by manual and machine excavation based on location of excavation and space constraints. The quoted rates are applicable for both manual and machine excavation, the location and extent of manual and machine excavation should be as described below,

a). Manual excavation.

The manual excavation for laying the sewers in pipeline trenches shall be carried out as decided and directed by the Engineer In-charge, along the alignment of such narrow roads and main roads where it is not possible for machine excavation and, at excavations in deeper depths of more than 3m, providing all safety measures to workmen at contractor’s risk, also, manual excavation is to be adopted at the possible locations of under ground utilities to safeguard against damage.

b). Machine excavation.

The machine excavation for laying the sewers in pipeline trenches shall be carried out along the alignment of wide roads and in depths where there are no under ground utilities without causing any damage to public property, and inconvenience to public.

Disintegrated Rock, Soft Rock and Soft Shale

This category includes excavation in disintegrated rock, soft rock, soft shale and in medium rock comprising of lime stone, hard shale, schist, fissured rock, and all types of laterite with varying densities and composition requiring chiseling which can be cut by shovel and but without resorting to blasting.

Hard Rock

This category includes excavation in hard rock requiring hand and/or mechanical chiselling.

In case of difference in opinion between the classifications of rocks, the decision of the Engineer shall be final and binding on the Contractor.

2.3. Shoring and Bracing

As per Specifications and directions of the Engineer, the Contractor shall supply, fix and maintain necessary sheathing, shoring and bracing etc., in steel or wood, as may be required to support the sides of the excavation, to protect workmen in the trench and to prevent any trench movement which might any way injure or delay the work, change the required width of the trench, make unsafe condition for adjacent pavements, utilities, buildings or other structures above or below ground.

Sheathing, shoring and bracing shall be withdrawn and removed as the backfilling is being done, except when the Engineer may agree that such sheathing, shoring and bracing be left in place, at the Contractor's request. In any case, the Contractor shall cut off any such sheathing at least 600 mm below the surface and shall remove the cut off material from the trench.

All sheathing, shoring and bracing which is left in place under the foregoing provisions shall be removed in a manner so as to, not endanger the completed work or other structures, utilities or property, whether public or private.

2.4. Excavation in Rock

Excavation in rock shall be carried out without resorting to any kind of blasting, to a depth, 150 mm more than the bottom level of pipe and to a width equal to the diameter of the pipe plus specified working space on either side as given in drawing / as mentioned above. Unless otherwise directed by the Engineer, rock excavation shall be progressed at least by 20 m in advance of the pipe length proposed to be laid.

2.5. Limits of excavation.

The trench for laying of sewers and construction of manholes shall be excavated in accordance with the relevant applicable Indian standard, as per the approved drawings, or as directed by the Engineer. The width at bottom of trenches for sewers, unless otherwise specified in the approved construction drawings, or directed and approved by Engineer, for different diameters of pipes laid at different depths shall be as given below,

a). For all diameters, up to an average depth of 1.20 m, width of trench in mm is equal to diameter of pipe plus 300 mm.

b). For all diameters for depths above 1.20 m, width of trench in mm is equal to diameter of pipe plus 400 mm.

c). Not with standing (a). and (b). the total width of trench should not be less than 0.75 meters for depths exceeding 0.90 meters.

The width at top of trenches for sewers shall depend on depth of sewer, location and alignment of sewer, as per the approved construction drawings and directions of Engineer. Unless other wise specified in the drawings or directed by Engineer, for providing of sheet piling as per specifications in Bill of quantities, the top widths for excavations up to 2 meters depth shall be equal to bottom width (i.e. vertical side cuts.) and for depths beyond two meters depth, for all types of soils/rock, steps shall be provided of 0.30 m width on either side of the trench at every lift of 2 meters and as per the directions of Engineer. The quoted rates for excavations in accordance with the above specifications shall include all shoring and strutting for all depths.

The depth of excavations shall limit to the specified gradients/reduced levels as per the approved construction drawings at ends, considering the necessary beddings/encasement/surround.

The Contractor shall not excavate beyond the dimensions specified as above. Should the excavation occur beyond the dimensions specified therein,

because of the negligence of the Contractor, the Contractor shall fill the excess space with granular material or concrete as directed by the Engineer. Nothing extra shall be paid to the Contractor on account of this. The contractor shall quote the rates for excavation items, limiting the trench widths as above for whatsoever depths encountered, including necessary arrangements as required. Any extra claim and increase in quantity other than the widths specified above, shall not be entertained or paid.

2.6. Trial pits

Trial pits shall be excavated by the Contractor, as directed to do so, along the lines of the trenches as shown on the drawings in advance of the excavations for the purpose of satisfying himself as to the location of under ground utilities, obstructions or soil strata's and conditions. Trial pits shall be excavated preferably by manual excavation. The contractor has to take the permission of the concerned Executive Engineer, BWSSB, before taking up the work.

It involves, Earth work excavation for trial pits in all kinds of strata and for all depths, recording necessary details of under ground utilities and kind of strata, including depositing on bank excavated earth, including barricading, posting safety sign boards, shoring, strutting, bailing out water, wherever necessary as directed with all lead and lifts etc., complete. Any damage to the existing utilities unless otherwise specified shall be repaired at Contractors own cost. The Precautionary measures shall be taken by the Contractor while making trial pits and shall inform the Engineer before commencing such works. The contractor will be paid as per the item in BOQ on account of this work.

2.7. Dewatering

Extra charges will be paid at quoted rates, for excavation in all classifications in watery situation or foul conditions towards dewatering including overnight recuperation for specified depth ranges with all lead and lifts etc., complete, including cost of installation and running of dewatering system such as well point system / any other system wherever required.

Dewatering shall be done in accordance with specifications. The Contractor shall be responsible for the adequate pumping, drainage and bailing out of water from the excavation in case of inundation etc., of trenches. The sewer lines shall be laid above normal ground water table level and as directed by the Engineer. Dewatering shall be either continuous or intermittent using Diesel pump or any other method approved by the Engineer. The method of dewatering shall depend on site condition and

should be furnished by the Contractor and approved by the Engineer. The method of dewatering shall be either well point system or sump pumping. The effectiveness of each method will depend upon the nature of the soil, the proportions of the trench and degree of lowering required. Pumping test may be necessary to determine which method is Suitable.

If sump pumping is not practicable other control methods shall be considered and should be approved by the Engineer. The trenches should be kept dry till the completion of work, which includes excavation, pipeline laying, jointing, testing and commissioning and backfilling. Precaution should be taken against the floatation of the pipes.

The Contractor shall conduct ground studies if found necessary and the cost for such studies has to be borne by the Contractor himself. The Contractor shall be responsible for the adequate pumping, drainage and bailing out of water met due to all causes from the excavation for laying sewer lines, construction of manholes, wet wells and all types of constructions. In case of failure to make such provisions or any other provisions, which may result in unsuitable sub-grade conditions, the Contractor shall replace and repair the sub-grade as directed to the satisfaction of the Engineer, at his own cost and responsibility. Should the Contractor select to use a gravel sub-grade with or without un jointed pipes with the gravel layers to facilitate flow of water to pumps or other points of disposal, such gravel sub grade with or without conveying pipes shall not be measured or paid as an extra item.

- Sump pumping

This method may be used in highly and moderately permeable soils such as gravels, sand and gravel mixtures. This method is simple and cheap to install and used with watertight trench sheeting to limit the volume of flow. To prevent the boiling in the bottom of the trench the following precaution should be taken

- Drive sheeting deeper to lengthen drainage path
- Use open pipe surrounded in gravel as a sump.
- Move the sump to one side of the trench

To prevent removal of fines from soil causing loss of strength in the soil and undermining of the trench bottom and side support

- Surround suction inlet with protected graded filter
- Increase flow rate through the soil by using open pipe surrounded with gravel.

The delivery side of the pump should be monitored by taking samples of water and checking the proportion of fines being removed. If fines are being

continuously withdrawn or there are signs of trench instability, sump pumping should be stopped and alternative methods to the considered.

- Well pointing

In this method, well points are installed at regular intervals on one or both sides of the trench and linked parallel to a header main connected to a pump. Well points are usually installed at 0.6 to 2.0m centre to centre by jetting them in ground with dense layers or cobbles & boulders it may be necessary to pre bore the layers. The efficiency of the well points is increased by sanding in the well point and riser using a column of sharp sand. This Method has an advantage of drawing water away from the trench and in suitable conditions is effective in lowering the water by 4 to 6m. It will also reduce the hydrostatic heads on the trench support system. It is of greatest use, in sand, the heavy flows in permeable ground, such as gravels, the well points should not to be so close together that the method becomes impractical. In clays the rate of seepage is too small for the system to be properly effective. Silts can be stabilized in certain conditions by using special procedures.

The well pointing shall be either single sided well point or double sided well point. For higher depths double sided well point with multi stage shall be considered. Should the Contractor select to use a gravel sub-grade to facilitate flow of water to pumps or other points of disposal, such gravel sub-grade shall not be measured or paid for as an extra item. Contractor should assess the availability of extra earth required for refilling in case of shortage in any particular reach well before quoting rates. Even in case the Contractor resorts to mechanical excavation, the Contractor should take care of proper refilling, consolidation and disposal of surplus earth. Disposal of ground water is to be away from the area of influence of the pipe laying area Suitable temporary pipelines are to be laid to existing watercourses.

2.8. Slips and slides

The Contractor is responsible for proper protection of excavations made by him from any slips and slides. All slides and caving shall be handled, removed or corrected by the Contractor without any extra compensation at whatever time and under whatever circumstances they may occur. The excavations shall be made good and brought to necessary depth, width and levels without any extra cost. Special care should be taken to protect the safety of the workmen, staff and public or whoever at the site.

2.9. Stacking of excavated material

Pursuant to specification in Bill of Quantities or directions of Engineer in-charge of execution, the excavated material shall be stacked at suitable locations so as not to cause any inconvenience to the public or traffic, with all safety measures in accordance with IS 3764 with latest revisions and amendments. The excavated material shall be placed away from the sides of

the trench. The excavated materials shall be stacked at a suitable distance, keeping in view the safety aspect of working personnel due to sliding and slippage based on nature of soil and condition. The contractor shall be solely responsible for the untoward incident caused due to his negligence of stacking the excavated material. Under circumstances where in, sewers have to be laid in narrow pathways, the excavated material shall be transported or placed with all lifts & lead as detailed in bill of quantities to the nearby suitable place or as decided by the Engineer and brought back after laying and jointing for refilling of the trenches as per specifications under clause 2.11.

2.10 Barricading.

The contractor shall Provide, erect and remove casurina pole three tier barricading using poles of 7.50 to 10 cms. Dia. And 1.50m height above ground fixed vertically at intervals of 2.0 to 2.5 mtrs. C/C and Horizontally at 0.50 mtrs, above ground level, including fixing poles in the ground for a minimum depth of 0.30 mtr. and tied with coir rope firmly including cost and conveyance of all materials, labour, lead and lift charges complete. The work will be paid as per the item in the BOQ.

2.11 : NA

2.12. Safety measures

Pursuant to Specifications in bill of quantities, relevant Indian standards or directions of the Engineer, the Contractor shall provide adequate safety measures. They shall include:

1. Barricading all sides of the open trenches.
2. Red danger lights as can be easily visible from dusk to dawn at an interval of 20 m and at all the road crossings.
3. Traffic signals and display boards giving direction for diversion of traffic at the appropriate places as may be directed by the Engineer.
4. Adequately safe wooden plank / board or steel plate over the trenches at every 15 meters interval or less depending upon access requirement to commercial, institutional and domestic properties to facilitate crossing by the public residing on either side of the trench.
5. Round the clock watch and ward maintaining all safety regulations at the site of work and protecting the site from unauthorized intrusions.

6. The work due to the above facilities/arrangements by the contractor will be paid for the items in bill of quantities and the cost for the remaining shall be deemed to be included in the relative items of work.

2.13. Progress of Excavation

The Contractor shall adjust excavation of trenches in such lengths that the pipes can be laid in such exposed portion of the trench within 3 days / less than 3 days as per criticality of site condition and directions of the Engineer.

Unless otherwise directed by the Engineer, the following limitations for lengths of open trenches shall rule for a pipeline in one continuous reach.

Not more than 50 m in built up area and 150 m elsewhere shall be opened in advance of pipe laying.

Not more than 50 m of pipeline left uncovered after pipe laying in built up areas and not more than 150 m elsewhere.

2.14. Excavation for Manholes and Other Appurtenant Structures.

Excavation for Manholes and other appurtenant structures shall be done in accordance with the applicable clauses from 2.1 to 2.14 of this Section. The Contractor shall excavate as required for all the structures with foundations to firm, undisturbed earth up to the level of the under side of the structure.

If the excavation is in rock, the Contractor shall excavate all rock at least to the minimum limits shown in approved drawings.

The standard details for trenches and to the grade of the bottom of Manholes and other structures are as per applicable clauses in this section and construction drawings issued for the execution of work. Where the bottom of the structure is in rock, it should be ensured that no rock shall project above the lower surface of the concrete in such a manner so as to reduce the required thickness of concrete placed simultaneously as an integral part of the foundation and to the outside of structure foundation where structure is to be built.

The Contractor shall excavate the trench / pit to provide necessary working space on all sides and for accommodating any sheathing, shoring or bracing etc.

2.15. Works Included in Excavation

The following works as per specifications are also included in excavation and the term 'Excavation' shall construe to mean all such items of work. The quoted rates should include the same:

1. Provision of side space or additional space in the trench / pit for working and /or accommodating sheathing, shoring, bracing, etc.
2. Supply, installation and removal after the work, all-sheathing, shoring and bracing required, protecting the excavation where required or where such work is recommended by the Engineer.
3. The bidder shall verify the site conditions and wherever such dewatering is required it is considered that the rates quoted for dewatering item of work are inclusive of dewatering of surface and sub-surface water.
4. Protection of excavations.
5. Providing adequate safety measures.
6. Additional work in connection with overhead wires and poles.
7. Excavations for socket and collar hollows.
8. Supplying and fixing of sight rails and boning rods in the trench to facilitate measurement of work etc. complete
9. Temporary approaches to roads, properties etc., affected by excavation at no extra cost.

2.16. Sheet piling : NIL

4.0 REINFORCED CEMENT CONCRETE PIPES

4.1. Manufacture of pipe

The RCC pipes to be used for lateral, branch and trunk / outfall sewers shall be of class NP-3, Spigot and Socket (S&S) type, RCC SPUN / VIBRATED CAST PIPES (REINFORCED), with rubber gasket jointing, manufactured in Conformity with IS 458. All the Pipes shall be manufactured using Sulphate Resisting cement only. The ends of the pipes shall conform to Clause 5.3 of IS 458 as applicable for S&S joints. The rubber ring shall conform to IS 5382 and IS 12820 as applicable for sewer lines and shall be of type 'IA'. The diameters of pipes shall be as required for sewers as per designs and drawings.

The method of manufacture shall be such that the form and dimensions of the finished pipes are accurate within the limits specified in relevant IS: 458. Pipes manufactured in compliance with IS: 458 shall be either water cured or steam cured in accordance with the relevant requirements of IS: 458.

The Internal diameter, wall thickness, length of barrel, reinforcement (longitudinal and spiral), type of ends and minimum clear cover to

reinforcement, strength test requirements, tolerances on - overall length, internal diameter or dimensions of sockets / spigots of pipes shall be as per the relevant clauses / tables of

IS: 458. Minimum clear cover to reinforcement shall be 15 mm. The tolerances regarding overall length, internal diameter of pipes or socket and barrel wall thickness shall be as per relevant clauses of IS: 458. Each pipe unit shall be in lengths of 2 m to 4 m based on availability, ease in handling, transportation and laying.

The workmanship and finish for the pipe will conform to the relevant Indian standard specification; Cleaning of pipes shall conform to relevant Indian Standard specification.

4.1.1. Special coating for Inside Surface of RCC Pipes.

The RCC pipes shall be provided with special coatings wherever there is possibility of excess generation of hydrogen sulphide gas during transportation of sewage through sewers. The location, length of coatings shall be as given in construction drawings or as approved by the Engineer.

The work involves

i). Supply and application of Polymer based protective Elastomeric coating / Lining with zero V.O.C. for complete inside surface of RCC sewers, with minimum dry film thickness of 1mm, Acid resistant, Abrasive resistant, Adhesive to concrete surface, Durable and pinhole / break free, with smooth surface after application, complete as per the Clauses in this Section, including all labour, HOM of machinery, with all lead lifts, taxes etc. complete. spray coating / Lining shall be applied by approved and controlled mechanical spray method, for RCC sewers of diameters 400mm to 800 mm prior to delivery of sewers to site or applied at site, as approved by approving authority, including all surface preparation, testing, as per directions of the Engineer in charge. Rate shall be inclusive of cost of all materials, tools and plants, testing and inspection etc. complete.

ii) Supply and application / lining of Polyvinyl chloride sheet, having T-shaped protections on the back, keyed into the RCC Sewer walls at the time of manufacture, of thickness not less than 1.5mm or Polymer based protective Elastomeric smooth coating / Lining with zero V.O.C. by spray method for complete inside surface of RCC sewers, with minimum dryfilm thickness of 1mm, Acid resistant, Abrasive resistant, Adhesive to concrete surface, Durable and pinhole / break free, smooth surface after application, complete as per the Clauses in this

Section, including all labour, HOM of machinery, with all lead, lifts, taxes etc. complete, spray coating / Lining applied by approved method, for RCC sewers of diameters equal to and greater than 900mm prior to delivery of sewers to site or applied at site, as approved by approving authority, including all surface preparation, testing, and directions of the Engineer in charge, Rate shall be inclusive of cost of all materials, tools and plants, testing and inspection etc. complete.

Specifications for Protective Coating to inside surface of RCC sewers:-

A). POLYMER BASED COATING :

a) The inside of RCC pipes (of dia 400mm & above) & manholes (if required) shall be coated with an approved dual-component, solvent-free polymer protective coating of minimum 1mm dry film thickness. The protective coating shall be spray-applied to the inside of the pipes using suitable plural component spray equipment so as to form a completely impermeable, pin-hole-free & seamless lining. It shall form a good bond with host concrete surface, be resistant to acids & abrasion. It shall meet the following properties.

A – ACID RESISTANCE	
Acid & Chemical Resistance (to ASTM 3908- mod 365d immersion)	Change in weight (not more than).
Sulphuric Acid 22%	0.07%
Hydrochloric Acid 10%	0.07%
H2S-120,000ppm (Sour Brine)	0.66%
Sodium Hydroxide 25%	0.07%
Sodium hypochlorite(sat sol)	0.66%
Salt water – 310g/l (Sat. Sol)	0.22%
Ammonium Hydroxide-20%	nil
Nacl/water-solution -10%	nil
Wastewater anaerobic digesters	0.37%
Wastewater API mo	1.1%
B – BOND	
Bond / Adhesion to concrete (to ASTM D 4541)	> 1.5 N / Sq mm
C - ABRASION RESISTANCE	

Abrasion resistance (to ASTM D 4060 with Taber CS17-1000/1000rev)	< 15 mg loss
Shore D Hardness (to ASTM D-2240)	> 60
D - DURABALITY	
Volume solids %	100
Tear resistance (to Die Cast ASTM D 624)	> 30 KN / m
Tensile strength (to ASTM D412)	>17 N / Sq mm
Elongation (to ASTM D-412)	> 30%
Water absorption(to ASTM D 570 (2hr @95 C)	0.16
Flash Point (Pensky martin)	>93 deg C
E – SETTING TIME	< 1 minute

b) The coating shall be moisture sensitive,suitable for long term service at any temperature within the range between -10 Deg C and 100 Deg C and resistant to raw sewer, industrial sewer, treated sewer, effluents, chemicals, sea water, abrasives. The coating shall not be affected by high humidity or moisture during application.

c) All the coating materials including primer & finish coats shall be from a single manufacturer of repute certified to ISO 9002 standards having a minimum 10 years experience in similar products & in projects of similar size and value as this project.

d) The material provided shall be tested in both liquid (lab-draw down films) and field applied samples and shall meet the properties specified for the project and defined in the approved manufacturer’s product data sheet.

e) All pre-coating concrete repairs, coating and lining works shall be carried out only by experienced & reputed contractors who are authorized, approved, and certified applicators of the approved coating manufacturer & certified by the manufacturer for the type of application detailed in this project.

f) The contractor should submit, the approved coating manufacturer’s detailed Method Statement for Coating Application along with their Quality Assurance / Inspection & Testing Plan to engineer in charge prior to commencement of coating activity.

Surface Preparation & Primer application

Prior to commencement of coating activity, all concrete surfaces to be coated shall be free from oil, grease, loose particles, decayed matter, moss, curing compound residue or algal growth. All such contamination and laitance must be removed by use of abrasive sweep blasting, high pressure water jetting, or other approved manual/ mechanical means.

Concrete element's surface irregularities, honeycombs spews must be removed and repaired by a method approved by the engineer.

Primer as recommended by the approved coating manufacturer shall be applied prior to coating application & the correct over coating time intervals shall be followed as per manufacturer's approved method statement of application.

The coating system shall be spray applied & shall gel/set rapidly. It shall form a uniform monolithic film without any layering.

The pipes shall be coated either at pipe factory or at other department-approved coating yard prior to actual laying.

Testing:-

The finished coating shall be uniform, smooth & have a dry film thickness of minimum 1000 microns, when tested with a standard dft gauge/ Elcometer.

The dry film thickness shall be measured at points as instructed & predetermined by the engineer in charge by fixing SS strips. The coating shall be uniform, smooth & pin hole free.

Personal Safety Requirements:-

The personnel at site shall strictly adhere to Standard guidelines during the chemical coating activity, at all times. The approved coating manufacturer shall supply complete standard requirement schedules for the personnel to follow, prior to start of any coating application. The general requirements are:-

a. Observe the owners standard policy at all times and obey all written and verbal instructions from site managers and representatives.

b. Wear all PPE at all times including Hard Hat, Safety glasses, Boots, Gloves and masks as required.

c. When preparing and applying coatings and chemical materials all PPE must be worn including Gloves, safety glasses and protective paper masks.

d. When using high pressure plural component spray equipment, all personnel working in the application area must wear double filter breathers with OSHA or of atleast equivalent make.

B). P.V.C. LINING FOR RCC PIPES:

Scope of work for PVC lining in RCC pipes,

Reinforced concrete pipes of diameter 900mm and above is to be lined with PVC of minimum thickness of 1.5 mm. The lining shall be fixed to concrete surface be mechanical keys and cover complete internal circumference of the pipes. Care shall be taken to see that the resulting wall thickness, internal diameter & length of barrel does not become less than the minimum specified in IS 458. The tolerances regarding overall length, internal diameter of pipes or socket and spigot wall thickness shall be as per IS: 458. However, due to providing of PVC lining, negative tolerance for internal diameter of pipe upto maximum 3 mm is permitted.

Drawings and details indicating method of manufacture, lining, welding of joints, etc., together with test certificates of physical, chemical and biological properties of the PVC shall be submitted for Engineers in charge's approval prior to manufacturing of any pipe.

The internal surface (PVC lining and unlined concrete surface) of the pipe shall be free from wrinkles, bulges, corrugations, burnt surfaces and imperfection. The lining shall be firmly keyed into the concrete with the back face of the lining flush against the concrete surface. The keys shall be continuous and capable of withstanding a back pressure of not less than 0.48 N/ mm2. Partially embedded keys will not be acceptable. There must be complete bonding in all welds.

Only pipes manufactured and lined to the satisfaction of the Engineers in charge are acceptable. Minor defects may be repaired with approval of Engineers – In charge but each defect must be made good to the complete satisfaction of the Engineer in Charge who reserves the right to reject any pipe (or pipes) which in his opinion do not comply with this Specification and the required standard.

Approved PVC lining should not be less than 1.5 mm thickness. In the event of the PVC lining being damaged during the construction

of the sewer, the whole pipe shall be replaced entirely at the Contractor's expense.

When pipes are laid, care shall be taken to keep the cover flaps clear of the adjoining pipe socket and to place the pipe in the correct position so that the PVC sheeting is evenly divided by the vertical pipe centre line.

At regular intervals the Contractor shall arrange for his pipe supplier to visit the site and weld up and test the PVC joint flaps and end cover fillets. Not more than three (3) pipes shall be laid before the joints are welded up.

The Contractor will be required to afford all necessary assistance in keeping the pipes clear of mud and water during the jointing of the PVC flaps.

The Contractor will be required to make arrangements for the supply of water and power and for the proper ventilation of the pipeline during cleaning, tacking and welding and testing of the PVC joints.

On completion of the laying, jointing and welding, the Contractor will be required to carry out a detailed inspection and test of the PVC lining and joint welding in the presence and to the satisfaction of the Engineer in charge.

Physical & chemical properties & testing methods.

TABLE A – PHYSICAL PROPERTIES

Property	Allowable Standard		Method
Tensile Strength	Longitudinal	17.25 Mpa	ASTM D 638
	Transverse	17.25 Mpa	
Elongation at break	Longitudinal	225%	ASTM D 638
	Transverse	225%	
Hardness	54-62		Din 535.5

Plasticier Permanence	0.4%	ASTM D 1203
Water Absorption	0.1%	ASTM D 570
Water soluble matter	0.05%	ASTM D570
Porosity	No pin holes	Spark Tester 7 KV

TABLE B – CHEMICAL PROPERTIES

Chemical Agent	Test Method	Change in Weight Not more than
Sodium Hypo–Chloride 1%	ASTM D 543 (7 days at 20 degree C)	0.20%
Ferric Chloride 1%		0.60%
Sodium Chloride 5%		0.15%
Sulphuric Acid 20%		0.12%
Nitric Acid 1%		0.20%
Sodium Hydroxide 5%		0.10%
Ammonium Hydroxide 5%		0.40%
Soap &Detergent Solution 2%		0.40%

4.2. Testing of pipes at manufacturing unit.

During manufacture, tests on concrete shall be carried out as per IS: 456, IS 458 / relevant IS with latest revisions and amendments.

The specimen of pipes shall be tested in accordance with clause 1.2.8 of this Technical specification and with IS: 458 and tested in accordance with the methods described in IS: 3597 including the following,

1. Hydrostatic test.

2. Three edge bearing test

3. Absorption test.

4.3. Marking

Marking shall be done as per IS: 458 or any other relevant IS codes approved by the Engineer. The following information shall be clearly marked on each pipe,

a). Internal diameter of pipe.

b). Class of pipe.

c). Date of manufacture and

d). Name of manufacture or his registered trade-mark or both.

a. *Carting & Handling*

Carting and handling of RCC pipes and fittings shall be in accordance with the clause 3.4. of GSW pipes specifications.

b. Trenching.

Trenching includes all excavation which shall be carried out either by hand or by machine and shall be carried out in accordance with all requirements of Earth work excavations clause 2.0 to 2.17. Wherever a socket or collar of pipe or fitting / special occurs, a grip is to be cut in the bottom of the trench or concrete bed to a depth of at least 75 mm below the bed of the pipe so that the pipe may have a fair bearing on its shaft and does not rest upon its socket. Such grip shall be of sufficient size in every respect to admit the hand all round the socket in order to make the joint, and the grip shall be maintained clear, until the joint has been approved by Engineer.

c. *Bedding*

Necessary bedding (granular, concrete cradle, concrete arch etc.) shall be provided in accordance with approved construction drawings and specifications in the following clauses 6.1. to 6.1.5 of this specifications before laying of RCC sewer pipes.

d. *Laying of the pipe*

Laying of concrete pipes shall conform to the Code of practice of IS: 783. Pipes shall be laid underground with a minimum earth cover of 1m. Pipes shall be generally laid in sections as per standard practices and as directed by the Engineer. The RCC pipes shall be laid with sockets facing up the gradient, on desired bedding. All pipes shall be laid perfectly true, both to line and gradient. At the close of each day’s work or at such other times when the pipe is not being laid, the end of the pipe should be protected by a close fitting stopper. All pipes, fittings and material shall be tested and approved by the Engineer before being laid. Any pipes, fittings or material

placed before they are tested and approved shall be removed and replaced with tested and approved material. Before laying the pipe, necessary bedding shall be provided wherever required as per Sub-Clauses 6.1. to 6.1.5 of this section.

e. *Jointing of pipes*

The pipe joints shall be flexible joints, jointed by rubber ring of type 'IA', as per IS 783-1985. The sections of the pipe shall be jointed in such a manner that there shall be as little unevenness as possible along the inside of pipe. Care should be taken while jointing to provide the correct gap between the end of spigot and back of the socket to ensure flexibility at each joint and correct location. The joints shall be finished as directed by the Engineer.The quality of rubber rings, tolerances, etc., shall be in conformity with IS 5382-1985 and latest revisions.After jointing, extraneous material, if any, shall be removed from the inside of the pipe.

f. *Measurement of pipes*

The length of the sewer pipes shall be measured between the inner surfaces of consecutive manholes at the invert level of the pipes along the central line of pipeline to the nearest centimeter.

g. *Testing at work site.*

After laying and jointing of pipes is completed, the pipe line shall be tested at work site as per all the requirements in clause 9.0 to 9.5 of this specifications and as approved by the Engineer.

h. *Backfilling.*

Backfilling shall be in accordance with requirements specified in clause 6.3 to 6.3.4. of backfilling.

5.deleted

Backfilling shall be in accordance with requirements specified in clause 6.3 to 6.3.4. of backfilling.

7.0 ANCILLARY STRUCTURES – MANHOLES, DROP MANHOLES AND VENTILATING SHAFTS.

The Contractor shall construct Wire cut brick, RCC-Manholes, Drop arrangements with HDPE pipes, Cast iron Ventilating shafts, Valve Chambers, at the locations shown on approved construction drawings, as directed by the Engineer as per the specification in the applicable Indian

standards mentioned and as mentioned hereafter. The materials used and construction procedure adopted for the ancillary structures shall comply to the specifications as mentioned below and clause in standard specifications for civil works.

7.1. Excavation

Earth work excavations for the Manholes, Drop arrangements and C.I. Ventilating shaft arrangements etc. shall be carried complying to specifications in clause 2.0 to 2.17 and specifications in bill of quantities.

7.2. Backfilling.

Backfilling for sewer ancillary structures shall be in accordance with requirements specified in clause 6.3 to 6.3.4 of Backfilling.

7.3. Manholes

Manholes shall be built at every change of alignment, gradient or diameter, at the head of all sewers and branches, at every junction of two or more sewers as shown on the drawings complying to IS: 4111 Part1-1967 and latest revisions and as per specifications in this section or as directed by Engineer. Sulphate resisting cement confirming to IS: 12330 shall be used for all the items of works for manholes. The shape of the manholes generally is circular with conical shape at top for Brick manholes, unless specifically stated as on drawings.

The Contractor shall be wholly responsible for giving suitable connections at the junctions of sewer lines with the manholes. The minimum depth of manhole shall be one meter or as in construction drawings or as directed by Engineer.

For House service connections directly to manholes, 110/160mm PVC pipes shall be placed during construction of manholes as per specifications in Clause 8.1.1. and items in BOQ, if the provisional pipes for House service connections are not placed due to the negligence of the contractor, the contractor has to redo the total work of dismantling of manhole shaft and placing of the pipes etc. at his own cost.

The Manholes have been divided into different categories based on depth, diameter and material of construction. Any manholes required to be provided extra, at the locations shown by the Engineer, shall be provided by the Contractor, for which payment shall be made at the quoted rates.

7.3.1. Wire cut Brick Manholes.

7.3.1.1. Construction.

The work shall be executed in accordance with the approved construction drawings and specifications involving,

a). Providing and constructing of 1:3:6 Cement Concrete foundation using approved quality aggregates of 40mm and downsize with an offset of 150mm all round the chamber.

b). Providing and constructing wire cut brick masonry in C.M 1:4 proportion using modular wire cut bricks of class designation 75 of approved quality and confirming to IS : 1077 with a tapering top portion as per approved construction drawings and providing cement mortar plaster in CM 1:3 proportion, 12mm thick inside and outside except for the conical surface outside, where the thickness of plaster shall be 20mm thick.Samples of bricks shall be tested as per IS : 3495 by the Contractor. Bricks rejected by the Engineer shall be removed from the site within 24 hours.Construction of Brick works shall be in accordance with IS 2212:1962 and latest revisions.

c). Providing and constructing benching with Cement Concrete 1:2:4 to the dimensions as on drawings with 1:6 slope in the concrete towards the central drain, plastered with CM 1:3 proportion, 20mm thick and finished with smooth coat of neat cement and fixing of inlet and outlet sewers in the walls with the internal periphery protected with an arch of 1:2:4 Cement Concrete with graded metal of 10mm to 20mm size.

d). Supplying and fixing of, 3 mm thick plastic (as per IS: 10910) encapsulated over 12mm dia. Fe-415 steel (as per IS: 1786) bar footsteps staggered at 300mm apart and providing and fixing of heavy duty circular steel fibre reinforced concrete (SFRC) manhole frame and covers of 560 mm diameter conforming to IS 12592 and the payment for providing of SFRC heavy duty manhole frame and covers shall be paid separately as per quoted rate for the item in bill of quantities.

e). The channel for the manhole shall be constructed in cement concrete of M15 grade. Both sides of the channel shall be taken up to the level of the crown of the outgoing sewer. They shall be benched up in concrete and rendered in cement mortar (1:1) of 20 mm thickness and formed to a slope of 1 in 12 towards the channel.

f). The manhole construction work includes curing, pouring tar over MH frame and cover, cost of tar, engraving manhole

number and flow direction on the inner surfaces etc., with all lead and lifts, finishing etc complete. The cement used for the construction of masonry works and internal & external plastering works of manholes shall be of sulphate resisting cement only confirming to IS:12330.

7.3.1.2. Testing.

All Brick Manholes shall be tested as per relevant provisions in CPHEEO Manual & relevant IS with latest revisions & amendments and specifications in clause 9.0 of Testing and commissioning.

7.3.1.3. Measurement & payment.

The depth of manhole shall be measured from the top of cover to the invert level of the deepest outgoing sewer from the manhole.The quoted rate for the Manholes for various depths as per the specifications and drawings shall include the cost of sulphate resisting cement, bedding concrete, benching concrete, wire cut brick masonry, plastering, foot steps, fixing SFRC manhole frame with cover, dewatering to keep the manhole dry until final testing etc complete.

The Rates for any fractional variation (increase or decrease) in the depth of the manhole on decimetre basis, shall be paid as per actuals, by adding the difference in rates between the immediately preceding and succeeding depths of such fractional depth of manhole on linear basis.

For Example: To pay 1.22M depth manhole:

Rate for 1M depth Manhole excluding manhole frame & cover and including encapsulated foot steps rate Rs. X.

Rate for 2 M depths Manhole excluding manhole frame & cover and including encapsulated foot steps rate Rs. Y.

Therefore rate for 1.22M depth Manhole

= Rs. X + (Y-X)/1.00 x 0.22.

Note: For the depths of manholes less than the lowest depths of Bill of Quantities item, the preceding manhole depth shall be taken as zero with zero value to arrive at the rate

7.3.2. RCC Manholes.

7.3.2.1. Construction.

The construction of RCC manholes shall be by Cast In-situ of Circular in shape or approved type Pre-Cast RCC, constructed using form vibrators of standard type, using SRC Cement confirming to IS: 12330. The type of manhole to be constructed shall be as approved by BWSSB, Contractor shall take prior approval for the Design and Process of manufacture of the Pre-cast RCC manholes, the type of

vibration for compaction of concrete for pre-cast manholes shall be invariably of form or table vibrator type.

The work of Cast In-situ RCC manholes includes,

a). Providing and constructing of 1:3:6 Cement Concrete foundation using approved quality aggregates of 40mm and downsize with an offset as given in the drawings.

b). Providing and laying granite jelly cement concrete 1:1.5:3 for beds of manholes etc., using 20mm and down size jelly including laying, tamping, etc. for a depth, as per drawings, with water proof compound for top plaster in CM 1:3 curing and smooth finishing for exposed faces with necessary centering and form work etc., complete as per specification, drawing and as directed by the Engineer.

c). Providing and laying cement concrete of 1:1.5:3 proportion for vertical walls using 20mm and down size jelly including laying, tamping, mixing of required quantity of water proof compound for every one bag of cement for plastering in CM 1:3 curing and smooth finishing for exposed faces with necessary centering and form work etc., complete as per specification, drawing and as directed by the Engineer.

d). Providing and constructing benching with Cement Concrete 1:1.5:3 to the dimensions as on drawings with 1:6 slope in the concrete towards the central drain, plastered with CM 1:3 proportion, 20mm thick and finished with smooth coat of neat cement and fixing of inlet and outlet sewers in the walls with the internal periphery protected with an arch of 1:1.5:3 Cement Concrete with graded metal of 10mm to 20mm size.

e). Providing and laying cement concrete of grade 1:1.50:3 proportion with 12mm to 20mm I.S.I gauge of approved gradation hard broken granite/aggregate including cost and conveyance of all materials with wood or steel shuttering form work including machine mixing , centering form work, scaffolding, tamping , vibrating , curing and smooth finish with CM 1:3, 12mm thick for inside surface for RCC Covering Flat Slab with all lead and lifts, etc. complete as per drawing, specification and as directed by the Engineer.

f). Providing, Supplying and fabricating of TMT (Fe-500) reinforcement steel of all sizes, including straightening, cutting,

bending, hooking, lapping and/or welding wherever required, placing in position, tieing with binding wire of approved quality and gauge including the cost of binding wire and anchoring to adjoining members wherever necessary including all laps and wastages etc., with all lead and lifts, complete as per design, specification and directed by Engineer.

g). Supplying and fixing of, 3 mm thick plastic (as per IS: 10910) encapsulated over 12mm dia. Fe-415 steel (as per IS: 1786) bar footsteps staggered at 300mm apart and providing and fixing of heavy duty circular steel fibre reinforced concrete (SFRC) manhole frame and covers of 560 mm diameter conforming to IS 12592 and the payment for providing of SFRC heavy duty manhole frame and covers shall be paid separately as per quoted rate for the item in bill of quantities.

h). The RCC Manhole cost includes all materials, steel, curing, pouring tar over MH frame and cover, cost of tar, engraving manhole number and flow direction on the inner surfaces etc., with all lead and lifts, finishing etccomplete. The cement used for the construction of RCC manhole and internal & external plastering works of manholes shall be of sulphate resisting cement only, confirming to IS:12330.

The work of construction of Pre-cast RCC manhole includes,

a). Providing & laying mechanically mixed cement concrete of M-15 grade with stone aggregate (with 20 mm nominal size graded stone aggregate) in benching, Neat cement punning over PCC benching, as given in the drawings.

b). Construction of approved type vibrated Pre-Cast RCC Manhole Chambers constructed using Sulphate resistant Cement & form vibrator of standard type for Circular Manhole Chambers of various internal dia (as indicated in BOQ) at bottom and 0.50 dia at top made up of pre-cast monolithic base, modular riser and top cone in M- 30 grade concrete placed & aligned to provide vertical sides, with O ring rubber gasket at each joint, water tight & adjustment rings over top cone, complete and all connections shall have, a water tight seal between the pipe and the manhole complete as per standard design & drawing.

c). Making connection of drain or sewer line with existing manhole including breaking in to and making good the walls, floors etc. with CC 1:1:5:3. Finishing with CM 1:3 with a floating coat of

neat cement and making necessary channels for drain etc. as per specification, drawing and as directed by the Engineer.

d). Providing, Supplying and fabricating of TMT (Fe-500) reinforcement steel of all sizes, including straightening, cutting, bending, hooking, lapping and/or welding wherever required, placing in position, tieing with binding wire of approved quality and gauge including the cost of binding wire and anchoring to adjoining members wherever necessary including all laps and wastages etc., with all lead and lifts, complete as per design, specification and directed by Engineer.

e). Providing MS Foot rests and fixing in manhole with CC Block of 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate of 20 mm nominal size) of size 20x20x10 cm with 20mm square bar foot rest, and providing and fixing of heavy duty circular steel fibre reinforced concrete (SFRC) manhole frame and covers of 560 mm diameter conforming to IS 12592 and the payment for providing of SFRC heavy duty manhole frame and covers shall be paid separately as per quoted rate for the item in bill of quantities.

f). The RCC Manhole cost includes providing danger lighting & use of sight rails & boning roads shoring & strutting wherever required, including sand bedding, watering, curing, cost of all materials, labour, supply & fabrication of steel, pouring tar over MH frame and cover, cost of tar, engraving manhole number and flow direction on the inner surfaces etc., with all lead and lifts, finishing etc complete. The cement used for the construction of RCC manhole and internal & external plastering works of manholes shall be of sulphate resisting cement only, confirming to IS:12330.

7.3.2.2. Testing.

All RCC Manholes shall be tested as in specifications in clause 9.1.3. of Testing of manholes.

7.3.2.3. Measurement & payment.

The depth of manhole both for Cast In-Situ / Pre-Cast RCC manholes shall be measured from the top of cover to the invert level of the deepest outgoing sewer from the manhole. The quoted rate for the Manholes for various depths as per the specifications and drawings shall include the cost of sulphate resisting cement, bedding concrete, benching concrete, RCC floor & roof slab, shaft walls, plastering, foot steps, fixing SFRC manhole

frame with cover, dewatering to keep the manhole dry until final testing etc complete.

The Rates for any fractional variation (increase or decrease) in the depth of the manhole on decimetre basis shall be paid as per actuals, by adding the difference in rates between the immediately preceding and succeeding depths of such fractional depth of manhole on linear basis.

For Example: To pay 1.22M depth manhole:

Rate for 1M depth Manhole excluding manhole frame & cover and including encapsulated foot steps rate Rs. X.

Rate for 2 M depths Manhole excluding manhole frame & cover and including encapsulated foot steps rate Rs. Y.

Therefore rate for 1.22M depth Manhole

= Rs. X + (Y-X)/1.00 x 0.22.

Note: For the depths of manholes less than the lowest depths of Bill of Quantities item, the preceding manhole depth shall be taken as zero with zero value to arrive at the rate.

7.4. Drop Manholes.

In a manhole, wherever the difference between the invert level of downstream sewer and the invert level of the upstream sewer is greater than 60 cm, a drop manhole shall be provided at that position. The locations and construction of the drop manholes shall be provided as on drawings.

HDPE Grade PE-100 pipes confirming to PN 6 as per IS:4984 with latest revisions and amendments suitably supported with MS fasteners at 300 mm c/c. for diameters pipe line as per Bill of Quantities, construction drawings and as directed by Engineer, specials conforming to IS: 1729 shall be used for providing the drop in the manhole & a suitable expander/reducer T-Joint at the top with incoming sewer and 45 degree bend at the bottom with HDPE specials to the direction of flow in the receiving sewer, encasing the pipe with cement concrete of 1:2:4 proportion including necessary centering and form work, vibrating, curing, including cost and conveyance of all materials, labour with all lead and lifts, etc., complete as per specification and as in construction drawing. The benching concrete in the manhole should surround the joint of the terminating bend and a neat channel shall be made in the benching concrete to direct the flow to the receiving sewer. A continuation of the incoming sewer should be built through the shaft wall to form a rodding and inspection eye, which should be provided with half blank flange as on drawing. The drop manhole arrangements shall be tested along with sewer lines.

7.5. Vent shafts.

CI Vent shafts shall be erected at places as on construction drawings or as directed by Engineer and as per Bill of Quantities. The work includes providing and fixing 150mm diameter, Cast Iron pipe for ventilating shaft of 5 meters high with specials and cowl and with suitable grips in C.C. 1:2:4 pillar using 10mm to 20mm graded hard granite/trap/basalt or any other approved metal with 15 cms thick C.C. around up to 1.22 mtrs above the GL and with a foundation base of 90x90x90 cmsplastered with 12 mm thick CM 1:3 to all exposed faces and linking the shaft to the manhole by means of 15 cm dia GSW pipes and specials, jointing with tar dipped hemp 1:1 1/2 CM caulking, curing with all lead and lifts etc., complete for all materials earth work excavation and refilling in all strata, and disposal of surplus earth as directed with all lead and lifts etc. complete.(Sulphate resistant cement shall be used).

9.0. TESTING AND COMMISSIONING.

9.1. Testing at site.

All sewers and appurtenances shall be tested before commissioning and trial run as per the specifications in this section. After laying and jointing of sewer pipes and before backfilling the trenches, the complete length of the sewer is to be checked for water tightness and the sole responsibility of arranging the necessary equipments and apparatus lies with the contractor at his own cost. Any damage during testing shall be contractor’s responsibility and shall be rectified by him free of cost. Water for testing shall be arranged by the Contractor at his own cost.

9.1.1. Water Test for Sewers.

After laying and jointing of sewer pipes and before backfilling the trenches, the complete length of the sewer is to be checked for water tightness. Employer may exempt water test for lateral sewers, where house service connections are to be connected immediately to lateral sewers.

The procedure for testing is as detailed below,

Each section of sewer shall be tested for water tightness from manhole to manhole To prevent change in alignment and disturbance after the pipes have been laid, it is desirable to backfill the pipes up to the top keeping at least 90cm length of the pipe open at the joints in case of longer length pipes.

In case of concrete and stoneware pipes with cement mortar joints, pipes shall be tested three days after cement mortar joints have been made. It is necessary that the pipelines are filled with water for about a week

before commencing the application of pressure to allow for the absorption by pipe wall.

The sewers are tested by plugging the upper end with a provision for an air outlet pipe with stop cock.. The water is filled through a funnel connected at the lower end provided with a plug. After the air has been expelled through the air outlet, the stop cock is closed and the water level in the funnel is raised to 2.50m above the invert at the upper end. Water level in the funnel is noted after 30 minutes and quantity of water required to restore the original water level in the funnel is determined. The pipeline under pressure is then inspected while the funnel is still in position. There shall not be any leaks in the pipe or the joints (small sweating on the pipe surface is permitted). Anysewer or part there of that does not meet the test shall be emptied and repaired or re-laid as required and tested again.

The leakage or quantity of water to be supplied to maintain the test pressure during the period of 10 minutes shall not exceed 0.2 lit/mm dia. of pipe per kilometer length per day.

Exfilteration test for detection of leakage shall be carried out at a time when the ground water table is low.

For concrete, R.C.C. pipes of more than 600mm dia. the quantity of water inflow can be increased by 10% for each additional 100mm of pipe dia.

After completion of the test all temporary seals shall be removed, the test water shall be drained out / pumped out and the line cleaned properly.

9.1.2. Test for Straightness and obstruction

As soon as a stretch of sewer is laid and tested, before commissioning the cleanliness of the pipeline is to be checked by the following tests as applicable and as decided by the Engineer.

a). Torch & Mirror Test

In this method of testing, a torch will be held one end of the pipeline inside a manhole and its image through the pipeline will be reflected and seen on a mirror held at the opposite end of the pipeline, inside the next manhole. Any obstruction / debris / major mis-alignment will not give a clear image in which case the pipeline will again be cleaned / rectified and the tests re-done.

b). Ring Test

In this method of testing two steel/ wooden rings of suitable thickness and design shall be fixed facing each other at a distance of 2 feet or more. The block of rings shall be inserted from one end of the pipeline, inside manhole and pulled by a rope fixed to the block from the other end of the pipeline, inside the next manhole. The rings shall be of dia 75 mm less than

the inside diameter of pipe under testing. The rope used for pulling the ring block may be inserted in the pipeline by suitable means. Any construction / debris / major misalignment will prevent the ring to pass through the pipeline in which case the pipeline will again be cleaned / rectified and the test redone, and no extra payment will be made. Alternately upon the approval of the Engineer, the sewer may be tested by inserting at the high end of the sewer, a smooth ball of a diameter 13 mm less than the pipe bore. In the absence of obstruction, such as yarn or mortar projecting through the joints, the ball should roll down the invert of the pipe and emerge at the lower end. Any construction / debris / major misalignment that prevent the ball to pass through the pipeline in which case, the pipeline shall be again cleaned / rectified and the tests redone, and no extra payment will be made.

9.1.3. Water Test for Manholes.

The entire height of Brick and RCC manhole shall be tested for water-tightness by closing both the incoming and outgoing ends of the sewers and filling the manhole with water. A drop in water level not more than 50mm per 24 hours shall be permitted. In case of high subsoil water it should be ensured that there is no leakage of ground water into the manhole by observing the manhole for 24 hours after emptying it.

9.1.4. Test Records

Complete test records shall be maintained for all tests carried out for sewers both during construction and after being in service. The tests carried out as in specifications, approved QAP shall be documented in the formats as approved by the Engineer and shall be carried out in the presence of the Engineer or his representative and shall be certified by the Engineer or his representative and the Contractor. All completed Test records/documents shall be submitted to the Engineer before submission of bills.

9.2. Commissioning

After satisfactory completion of works and Testing of the sewer lines and appurtenances as per specifications in above clauses, the system shall be commissioned for trial run and operation.

9.3. Final Finishing

The contractor will ensure that the entire structure along with all its installations is in finished and in new and fully operative condition when handed over. He shall have repaired and removed all signs of damage that might have been done during the course of construction of manholes and laying of sewers. He shall also see that the entire exterior has been finished properly and the entire site is

cleared of all extra construction material, debris, and excavated soil. This shall have to be done to the satisfaction of the Engineer.

9.4. As Built Drawings

The contractor shall submit to the Engineer within two months of actual completion of the work, “As Built” Drawings as specified below and operation and maintenance instructions for the whole of the Works. These Drawings shall be accurate and correct in all respects, including the existing sewer network for which the contractor has done the condition assessment survey, shall be submitted to, and approved by the Engineer. Completion Drawings as below on two prints and one polyester film shall be supplied by the contractor, along with a soft copy in CD. These drawings shall be developed in Auto CAD. Drawing shall be of standard size as below,

i). Strip Plans and L-sections of Under Ground Drainage system showing pipe work in package area on scale as per standard practices to the satisfaction of the Engineer, showing sewer alignments, levels, appurtenances, sizes and material of pipe etc. complete.

ii). Structural Drawings showing reinforcement details of all the components covered under this contract as per standard practices.

12.0 General Civil Specifications:

The following civil specifications shall be applicable for providing and executing all such items which are not mentioned in foregoing paras but are necessary to be provided and for the items in bill of quantities which are mentioned above but require some elaboration. No extra cost shall be paid for such items. It should clearly be understood by the Contractors / tendering firms that all civil specifications mentioned here below shall be treated as part of the technical specifications already mentioned. The specific requirement of different items of work involved in the construction, completion and commissioning of the system as a whole, shall be provided in accordance with the requirement given in these civil specifications.

12.1. Site Clearance

Before taking up construction, site shall be cleared of all jungles, bushes and unwanted vegetation growth. After completion of plant, the entire site area shall be cleared of all left over material and debris. The work shall be carried out in accordance with the

specifications in bill of quantities and payment shall be as per quoted rates for the respective items.

12.2. Sections for excavation for all underground structures and pipe lines

Contractor shall prepare sectional drawings showing the details of excavation for all underground structures and pipe lines, in all kinds of soils, boulders, soft and hard rock etc., based on test results of soil testing and investigation reports complying to specifications in clause 2.0 to 2.15 for earthwork excavations and shall submit to the Engineer for review and approval, prior to starting of the work. If during excavation any change in section is considered necessary for reasons of safety of workers, the Engineer will issue directions for compliance by the Contractor. The Contractor shall comply with the Engineer's directions without any extra charge or payment.

12.3. Form Work

Formwork, shuttering, centering, scaffolding etc., shall be of steel plates or plywood, lined with MS-sheets and for scaffolding steel tubular shall be used. Joints should be sufficiently tied to prevent loss of cement slurry from the concrete. All forms, shuttering shall be levelled, aligned, and thoroughly cleaned, before they are used for concreting. Formwork shall be removed after specified days of curing with the prior written permission of the Engineer. The surface of RCC after removal of formwork / shuttering shall be smooth and even and without honeycombing or undulations.

12.4. Procedure and Materials used in concrete works.

The procedure for concrete works shall be in accordance with the specifications in the bill of quantities, specifications in this section and complying to standard practices in IS:456-2000 with latest amendments, all concrete works shall be executed in accordance with standard practices, including volumetric batching using boxes of standard size, concrete mixers with hopper, compaction using vibrators and according to the directions of the Engineer In-charge of works.

12.4.1. Aggregates.

All aggregates, fine and course used in concreting works shall comply to the standards laid down in IS: 456-2000 with latest amendments and specifications in applicable clauses in this section.

12.4.2. Water.

The water used in all concreting works shall be of potable quality and tested before usage in the construction works and shall be confirming to IS: 456-2000.

12.4.3. Cement.

The cement used shall be of sulphate resisting cement confirming to IS: 12330 as specified and where ever the concrete is coming in contact with sewage. For other concreting works like encasing pipe, pedestals and other structures where there is no contact with sewage, it shall be OPC confirming to IS:8112 with latest amendments and revisions.

12.5. Minimum clear cover over Reinforcement

Minimum clear cover over the steel reinforcement shall be 50mm for the members contact with soil/ground water. For other faces the clear cover over the reinforcement shall be as per latest IS Codes.

12.6. Tested Steel

Only tested and approved steel shall be used for reinforcement in RCC works, and the Contractor shall produce the test certificates to the Engineer. The type of steel used shall be of TMT of grade of steel Fe: 500 confirming to relevant IS.

12.7. Restoration of Storm water drains & other Miscellaneous works.

The storm water drains and cover slabs damaged during execution of works which is not due to the negligence of the contractor as decided by the Engineer shall be restored as per the items in bill of quantities. The specifications in this section are deemed to govern the applicable items in the bill of quantities. All masonry works, concrete works shall be in accordance with relevant IS as mentioned in clause 1.2.6. of this section and or as directed by the Engineer. Other repairs works under heading “Miscellaneous works” in bill of quantities shall be executed in accordance with the specifications and as directed by the Engineer, the finished item of work shall give neat appearance and should serve the intended purpose of the component to the satisfaction of the Engineer.

12.8. Disposal of night soil.

The night soil from the existing soak pits shall be cleared and desilted by the bidder including backfilling of the pits to required compaction, handling, salvaging and disposal of night soil /sludge. A suitable site should be identified by the Contractor & approver by the Engineer, for safe disposal of sewage /silt / sludge removed (preferably approved sludge disposal sites of STPs), excavations at the pumping / lifting station sites, which should be away from the water bodies, residential & sensitive areas, agricultural areas and etc. The costs towards removing handling & disposal of night soil / sludge shall be borne by the contractor & is deemed to be included in the quoted offer of the Bidder. If required & certified by the Engineer, sewer cleaning machine will be provided free of cost, for sucking the sewage from soak pit, As soon as the work at the soak pit is completed the pit shall be filled with earth in layers not exceeding 15 cm, each layer shall be watered, rammed & properly consolidated before the succeeding one is laid. Each layer shall be consolidated to the required standard specification. The final backfill surface shall be trimmed & levelled as directed by the Engineer in charge.

13.0 TRAINING AFTER COMMISSIONING & DEFECT LIABILITY PERIOD : NA

13.2. Trial run of the system

After commissioning of works, the contractor shall maintain the works for 3 (three) months to demonstrate satisfactory performance to the Engineer prior to taking over by the Employer. The cost of electricity, if required for operation & maintenance of works during the period of this trial run will be borne by the Employer. The cost towards Contractors Engineer and other operating personnel during the said period of trial run, along with cost of tools and spare parts which are required for operation and maintenance of the works and equipment during the trial run period shall be borne by the Contractor and shall be included in the quoted bid price. In the event that the system or any of the facilities do not satisfactorily achieve the required performance standards during this period, the trial run period shall be extended until such time as the Contractor has satisfactorily rectified any deficiencies as may be necessary to satisfy the performance requirements. No additional compensation will be paid to the Contractor for such extension.

13.3. Defects Liability Period

During 12 month Defects Liability period, the Contractor has to set right the defects of any kind in the manufacture, laying and jointing of sewer lines and its appurtenants works, other civil and mechanical works in his scope including replacement of defective items, labour

and technical services if required and also making good the restored road surface as mentioned above in case of settlement.Contractor shall be responsible to monitor and ensure the successful performance of thesystem throughout the Defects Liability Period, and shall be responsible to ensure that the Employer's Personnel are provided with on-the-job training as may be necessary to ensure uninterrupted satisfactory Performance of the system and facilities by the Employer's Personnel after completion of thecontract period

SECTION 7: DRAWINGS

SECTION 8: BILL OF QUANTITIES

Sl. No.	Description of item (with brief specification and reference to Book of specification)	Quantity	Unit	In figures	In words	Amount (Rs)
Total Tender Price (in figures)						
(in Words)						

SECTION 9: FORMAT OF BANK GUARANTEE

FORMAT OF BANK GUARANTEE FOR SECURITY DEPOSIT

To: _____ [name of Employer]
_____ [address of Employer]

WHEREAS _____ [name and address of Contractor] (hereinafter called "the Contractor") has undertaken, in pursuance of Contract No. _____ dated _____ to execute _____ [name of Contract and brief description of Works] (hereinafter called "the Contract");

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of Rs._____ [amount of guarantee] [1]Rupees_____[in words], and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of -_____ [amount of guarantee][2]as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed there under or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee shall be valid until 30 days from the date of expiry of the Defects Liability Period.

Signature and seal of the guarantor _____

Name of Bank _____

Address _____

Date _____

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